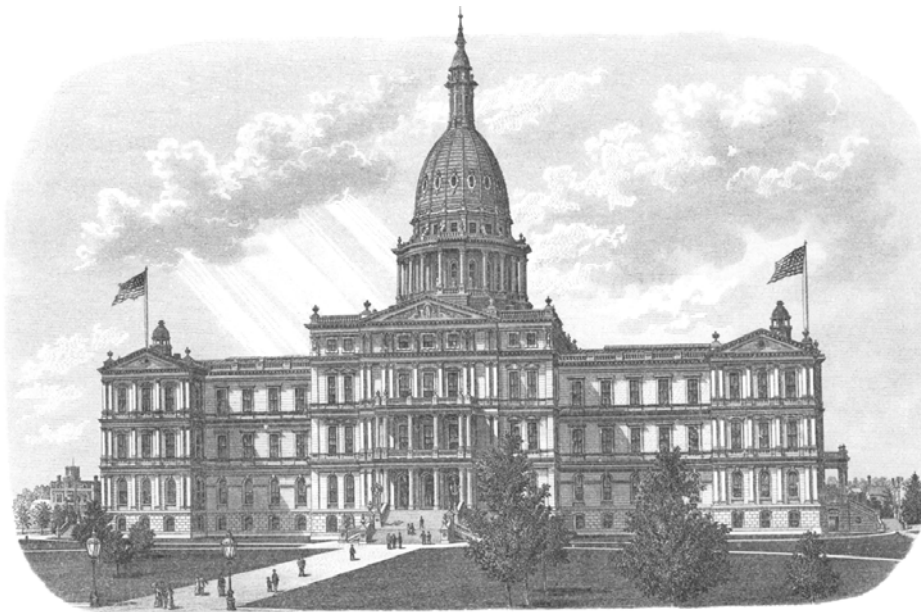


# Michigan Register

Issue No. 16— 2007 (Published September 15, 2007)



# GRAPHIC IMAGES IN THE MICHIGAN REGISTER

## COVER DRAWING

### *Michigan State Capitol:*

This image, with flags flying to indicate that both chambers of the legislature are in session, may have originated as an etching based on a drawing or a photograph. The artist is unknown. The drawing predates the placement of the statue of Austin T. Blair on the capitol grounds in 1898.

(Michigan State Archives)

## PAGE GRAPHICS

### *Capitol Dome:*

The architectural rendering of the Michigan State Capitol's dome is the work of Elijah E. Myers, the building's renowned architect. Myers inked the rendering on linen in late 1871 or early 1872. Myers' fine draftsmanship, the hallmark of his work, is clearly evident.

Because of their size, few architectural renderings of the 19<sup>th</sup> century have survived. Michigan is fortunate that many of Myers' designs for the Capitol were found in the building's attic in the 1950's. As part of the state's 1987 sesquicentennial celebration, they were conserved and deposited in the Michigan State Archives.

(Michigan State Archives)

### *East Elevation of the Michigan State Capitol:*

When Myers' drawings were discovered in the 1950's, this view of the Capitol – the one most familiar to Michigan citizens – was missing. During the building's recent restoration (1989-1992), this drawing was commissioned to recreate the architect's original rendering of the east (front) elevation.

(Michigan Capitol Committee)

# Michigan Register

**Published pursuant to § 24.208 of  
The Michigan Compiled Laws**



**Issue No. 16— 2007**

(This issue, published September 15, 2007, contains  
documents filed from August 15, 2007 to September 1, 2007)

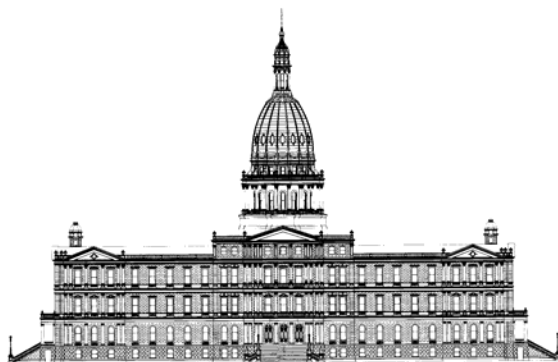
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**Peter Plummer**, Executive Director, State Office of Administrative Hearings and Rules; **Deidre O'Berry**, Administrative Rules Analyst for Operations and Publications.

**Jennifer M. Granholm, Governor**



**John D. Cherry Jr., Lieutenant Governor**

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## PREFACE

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### PUBLICATION AND CONTENTS OF THE MICHIGAN REGISTER

The State Office of Administrative Hearings and Rules publishes the *Michigan Register*.

While several statutory provisions address the publication and contents of the *Michigan Register*, two are of particular importance.

MCL 24.208 states:

Sec. 8 (1) The State Office of Administrative Hearings and Rules shall publish the Michigan register at least once each month. The Michigan register shall contain all of the following:

- (a) Executive orders and executive reorganization orders.
  - (b) On a cumulative basis, the numbers and subject matter of the enrolled senate and house bills signed into law by the governor during the calendar year and the corresponding public act numbers.
  - (c) On a cumulative basis, the numbers and subject matter of the enrolled senate and house bills vetoed by the governor during the calendar year.
  - (d) Proposed administrative rules.
  - (e) Notices of public hearings on proposed administrative rules.
  - (f) Administrative rules filed with the secretary of state.
  - (g) Emergency rules filed with the secretary of state.
  - (h) Notice of proposed and adopted agency guidelines.
  - (i) Other official information considered necessary or appropriate by the State Office of Administrative Hearings and Rules.
  - (j) Attorney general opinions.
  - (k) All of the items listed in section 7(1) after final approval by the certificate of need commission or the statewide health coordinating council under section 22215 or 22217 of the public health code, 1978 PA 368, MCL 333.22215 and 333.22217.
- (2) The State Office of Administrative Hearings and Rules shall publish a cumulative index for the Michigan register.
  - (3) The Michigan register shall be available for public subscription at a fee reasonably calculated to cover publication and distribution costs.
  - (4) If publication of an agency's proposed rule or guideline or an item described in subsection (1)(k) would be unreasonably expensive or lengthy, the State Office of Administrative Hearings and Rules may publish a brief synopsis of the proposed rule or guideline or item described in subsection (1)(k), including information on how to obtain a complete copy of the proposed rule or guideline or item described in subsection (1)(k) from the agency at no cost.
  - (5) An agency shall transmit a copy of the proposed rules and notice of public hearing to the State Office of Administrative Hearings and Rules for publication in the Michigan register.

MCL 4.1203 states:

Sec. 203. (1) The Michigan register fund is created in the state treasury and shall be administered by the State Office of Administrative Hearings and Rules. The fund shall be expended only as provided in this section.

- (2) The money received from the sale of the Michigan register, along with those amounts paid by state agencies pursuant to section 57 of the administrative procedures act of 1969, 1969 PA 306, MCL 24.257, shall be deposited with the state treasurer and credited to the Michigan register fund.
- (3) The Michigan register fund shall be used to pay the costs preparing, printing, and distributing the Michigan register.
- (4) The department of management and budget shall sell copies of Michigan register at a price determined by the State Office of Administrative Hearings and Rules not to exceed cost of preparation, printing, and distribution.
- (5) Notwithstanding section 204, beginning January 1, 2001, the State Office of Administrative Hearings and Rules shall make the text of the Michigan register available to the public on the internet.
- (6) The information described in subsection (5) that is maintained by the State Office of Administrative Hearings and Rules shall be made available in the shortest feasible time after the information is available. The information described in subsection (5) that is not maintained by the State Office of Administrative Hearings and Rules shall be made available in the shortest feasible time after it is made available to the State Office of Administrative Hearings and Rules.
- (7) Subsection (5) does not alter or relinquish any copyright or other proprietary interest or entitlement of this state relating to any of the information made available under subsection (5).
- (8) The State Office of Administrative Hearings and Rules shall not charge a fee for providing the Michigan register on the internet as provided in subsection (5).
- (9) As used in this section, "Michigan register" means that term as defined in section 5 of the administrative procedures act of 1969, 1969 PA 306, MCL 24.205.

#### **CITATION TO THE MICHIGAN REGISTER**

The *Michigan Register* is cited by year and issue number. For example, 2001 MR 1 refers to the year of issue (2001) and the issue number (1).

#### **CLOSING DATES AND PUBLICATION SCHEDULE**

The deadlines for submitting documents to the State Office of Administrative Hearings and Rules for publication in the *Michigan Register* are the first and fifteenth days of each calendar month, unless the submission day falls on a Saturday, Sunday, or legal holiday, in which event the deadline is extended to include the next day which is not a Saturday, Sunday, or legal holiday. Documents filed or received after 5:00 p.m. on the closing date of a filing period will appear in the succeeding issue of the *Michigan Register*.

The State Office of Administrative Hearings and Rules is not responsible for the editing and proofreading of documents submitted for publication.

Documents submitted for publication should be delivered or mailed in an electronic format to the following address: MICHIGAN REGISTER, State Office of Administrative Hearings and Rules, Ottawa Building - Second Floor, 611 W. Ottawa, P.O. Box 30695, Lansing, MI 48933.

### **RELATIONSHIP TO THE MICHIGAN ADMINISTRATIVE CODE**

The *Michigan Administrative Code* (1979 edition), which contains all permanent administrative rules in effect as of December 1979, was, during the period 1980-83, updated each calendar quarter with the publication of a paperback supplement. An annual supplement contained those permanent rules, which had appeared in the 4 quarterly supplements covering that year.

Quarterly supplements to the Code were discontinued in January 1984, and replaced by the monthly publication of permanent rules and emergency rules in the *Michigan Register*. Annual supplements have included the full text of those permanent rules that appear in the twelve monthly issues of the *Register* during a given calendar year. Emergency rules published in an issue of the *Register* are noted in the annual supplement to the Code.

### **SUBSCRIPTIONS AND DISTRIBUTION**

The *Michigan Register*, a publication of the State of Michigan, is available for public subscription at a cost of \$400.00 per year. Submit subscription requests to: State Office of Administrative Hearings and Rules, Ottawa Building - Second Floor, 611 W. Ottawa, P.O. Box 30695, Lansing, MI 48933. Checks Payable: State of Michigan. Any questions should be directed to the State Office of Administrative Hearings and Rules (517) 335-2484.

### **INTERNET ACCESS**

The *Michigan Register* can be viewed free of charge on the Internet web site of the State Office of Administrative Hearings and Rules: [www.michigan.gov/cis/0,1607,7-154-10576\\_35738---,00.html](http://www.michigan.gov/cis/0,1607,7-154-10576_35738---,00.html)

Issue 2000-3 and all subsequent editions of the *Michigan Register* can be viewed on the State Office of Administrative Hearings and Rules Internet web site. The electronic version of the *Register* can be navigated using the blue highlighted links found in the Contents section. Clicking on a highlighted title will take the reader to related text, clicking on a highlighted header above the text will return the reader to the Contents section.

Peter Plummer, Executive Director  
State Office of Administrative Hearings and Rules

## 2007 PUBLICATION SCHEDULE

Issue No.	Closing Date for Filing or Submission Of Documents (5 p.m.)	Publication Date
1	January 15, 2007	February 1, 2007
2	February 1, 2007	February 15, 2007
3	February 15, 2007	March 1, 2007
4	March 1, 2007	March 15, 2007
5	March 15, 2007	April 1, 2007
6	April 1, 2007	April 15, 2007
7	April 15, 2007	May 1, 2007
8	May 1, 2007	May 15, 2007
9	May 15, 2007	June 1, 2007
10	June 1, 2007	June 15, 2007
11	June 15, 2007	July 1, 2007
12	July 1, 2007	July 15, 2007
13	July 15, 2007	August 1, 2007
14	August 1, 2007	August 15, 2007
15	August 15, 2007	September 1, 2007
16	September 1, 2007	September 15, 2007
17	September 15, 2007	October 1, 2007
18	October 1, 2007	October 15, 2007
19	October 15, 2007	November 1, 2007
20	November 1, 2007	November 15, 2007
21	November 15, 2007	December 1, 2007
22	December 1, 2007	December 15, 2007
23	December 15, 2007	January 1, 2008
24	January 1, 2008	January 15, 2008

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**FILED WITH THE SECRETARY OF STATE**

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*MCL 24.208 states in part:*

*“Sec. 8. (1) The State Office of Administrative Hearings and Rules shall publish the Michigan register at least once each month. The Michigan register shall contain all of the following:*

\*       \*       \*

*(f) Administrative rules filed with the secretary of state.”*

---

**ADMINISTRATIVE RULES**

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SOAHR 2007-023

DEPARTMENT OF LABOR & ECONOMIC GROWTH

DIRECTOR'S OFFICE

OCCUPATIONAL HEALTH STANDARDS

Filed with the Secretary of State on August 28, 2007

These rules become effective immediately upon filing with the Secretary of State unless adopted under sections 33, 44, or 45a(6) of 1969 PA 306. Rules adopted under these sections become effective 7 days after filing with the Secretary of State.

(By authority conferred on the director of the department of labor and economic growth by sections 14 and 24 of 1974 PA 154 and Executive Reorganization Order Nos. 1996-1, 1996-2, and 2003-18, MCL 408.1014, 408.1024, 330.3101, 445.2001, and 445.2011)

R 325.52801 is added to the Michigan Administrative code and O.H. Rule 3235 is rescinded as follows:

**PART 528. SPRAY-FINISHING OPERATIONS**

R 325.52801 Rescission of O.H. rule 3235.

Rule 1. O.H. rule 3235 which was incorporated by reference pursuant to section 14 of 1974 PA 154, MCL 408.1014, is rescinded.

Rule 3235 Rescinded.

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**ADMINISTRATIVE RULES**

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SOAHR 2007-030

DEPARTMENT OF LABOR AND ECONOMIC GROWTH

STATE OFFICE OF ADMINISTRATIVE HEARINGS AND RULES

DISCIPLINARY PROCEEDINGS

Filed with the Secretary of State on August 16, 2007

These rescissions become effective immediately upon filing with the Secretary of State.

(By authority conferred on the State Office of Administrative Hearings and Rules by 1978 PA 368 and Executive Reorganization Order Nos. 2003-1 and 2005-1, MCL 333.16141, 445.2011, and 445.2021)

R 338.964, R 338.965, R 338.966, R 338.967, R 338.968, R 338.969, R 338.970, R 338.971, R 338.972, R 338.973, R 338.974, R 338.975, R 338.976, R 338.977, R 338.978, and R 338.979 of the Michigan Administrative Code are rescinded.

R 338.964 Rescinded.  
R 338.965 Rescinded.  
R 338.966 Rescinded.  
R 338.967 Rescinded.  
R 338.968 Rescinded.  
R 338.969 Rescinded.  
R 338.970 Rescinded.  
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R 338.973 Rescinded.  
R 338.974 Rescinded.  
R 338.975 Rescinded.  
R 338.976 Rescinded.  
R 338.977 Rescinded.  
R 338.978 Rescinded.  
R 338.979 Rescinded.

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**ADMINISTRATIVE RULES**

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SOAHR 2007-031

DEPARTMENT OF COMMUNITY HEALTH

DIRECTOR'S OFFICE

DISCIPLINARY PROCEEDINGS

Filed with the Secretary of State on August 16, 2007

These rescissions become effective immediately upon filing with the Secretary of State.

(By authority conferred on the Department of Community Health by 1978 PA 368 and Executive Reorganization Order Nos. 1996-1, 1996-2, and 2003-1, MCL 333.16141, 330.3101, 445.2001, and 445.2011)

R 338.951, R 338.952, R 338.953, R 338.954, R 338.955, R 338.956, R 338.957, R 338.958, R 338.959, R 338.960, R 338.961, R 338.962, R 338.963, R 338.980, R 338.981, R 338.982, R 338.983, R 338.984, R 338.985, R 338.986, R 338.987, R 338.988, R 338.989, and R 338.990 of the Michigan Administrative Code are rescinded.

R 338.951 Rescinded.

R 338.952 Rescinded.

R 338.953 Rescinded.

R 338.954 Rescinded.

R 338.955 Rescinded.

R 338.956 Rescinded.

R 338.957 Rescinded.

R 338.958 Rescinded.

R 338.959 Rescinded.

R 338.960 Rescinded.

R 338.961 Rescinded.

R 338.962 Rescinded.

R 338.963 Rescinded.

R 338.980 Rescinded.

R 338.981 Rescinded.

R 338.982 Rescinded.

R 338.983 Rescinded.

R 338.984 Rescinded.

R 338.985 Rescinded.

R 338.986 Rescinded.

R 338.987 Rescinded.

R 338.988 Rescinded.

R 338.989 Rescinded.

R 338.990 Rescinded.

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**PROPOSED ADMINISTRATIVE RULES,  
NOTICES OF PUBLIC HEARINGS**

---

*MCL 24.242(3) states in part:*

*“... the agency shall submit a copy of the notice of public hearing to the State Office of Administrative Hearings and Rules for publication in the Michigan register. An agency's notice shall be published in the Michigan register before the public hearing and the agency shall file a copy of the notice of public hearing with the State Office of Administrative Hearings and Rules.”*

*MCL 24.208 states in part:*

*“Sec. 8. (1) The State Office of Administrative Hearings and Rules shall publish the Michigan register at least once each month. The Michigan register shall contain all of the following:*

\*       \*       \*

*(d) Proposed administrative rules.*

*(e) Notices of public hearings on proposed administrative rules.”*

---

**PROPOSED ADMINISTRATIVE RULES**

---

SOAHR 2006-043

DEPARTMENT OF ENVIRONMENTAL QUALITY

AIR QUALITY DIVISION

AIR POLLUTION CONTROL

Filed with the Secretary of State on

This rule becomes effective immediately upon filing with the Secretary of State unless adopted under sections 33, 44, 45a(6), or 48 of 1969 PA 306. Rules adopted under these sections become effective 7 days after filing with the Secretary of State.

(By authority conferred on the director of the department of environmental quality by sections 5503 and 5512 of 1994 PA 451, MCL 324.5503 and 324.5512, and Executive Reorganization Order No. 1995-18, MCL 324.99903)

Draft 7/13/2007

R 336.1640 is added to the Michigan Administrative Code as follows:

**PART 6. EMISSION LIMITATIONS AND PROHIBITIONS--  
EXISTING SOURCES OF VOLATILE ORGANIC COMPOUND EMISSIONS**

R 336.1640 Emission of volatile organic compounds; existing process operations utilized in manufacture of Portland cement at facility located in Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne counties.

Rule 640. (1) After April 30, 2008, a person shall not operate existing kilns, located in Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne counties, utilized in the manufacture of Portland cement unless all of the provisions of subrules (2) to (8) of this rule are met.

(2) Each year during the ozone season starting May 1 and ending September 30, the emission of volatile organic compounds from the Portland cement kilns shall not be more than 1.31 pounds per ton of clinker produced, based on a daily averaging period.

(3) Compliance with the emission limits specified in subrule (2) of this rule shall be phased in as follows:

(a) From May 1, 2008, to September 30, 2008, compliance with emission limits in subrule (2) of this rule shall be applicable to 1 Portland cement kiln only.

(b) From May 1, 2009, to September 30, 2009, and for each May 1 to September 30 ozone season thereafter, compliance with emission limits in subrule (2) of this rule shall be applicable to all Portland cement kilns.

(4) Compliance with the emission limits specified in subrule (2) of this rule shall be determined using the method described in R 336.2004(1)(t) or an alternate method approved by the department. Upon request by the department, a person responsible for the operations of the kiln(s) that are subject to the provisions of subrule (2) of this rule shall submit to the department test data and production information necessary for a determination of compliance.

(5) Not later than 3 months after the effective date of this rule and thereafter, a person responsible for the operations of the kiln(s) subject to the provisions of subrule (2) of this rule shall obtain current information and keep records necessary for a determination of compliance with the provisions of this rule, that include the continuous production rate and annual emission rate of volatile organic compounds, shown as pounds of volatile organic compounds per ton of clinker produced (pound/ton clinker) and tons of volatile organic compounds emitted per year (ton/year) respectively. This information may include any of the following information:

- (a) Emissions monitoring or test data.
- (b) Material balance calculations.
- (c) Process production rates.
- (d) Control equipment specifications and operating parameters.

(6) A person responsible for the operations of the kiln(s), subject to the provisions of this rule, shall submit to the department a written program for compliance with this rule or evidence of compliance with this rule. The written program or evidence of compliance shall be submitted to the department not later than 15 days after the effective date of this rule.

(7) The program required by subrule (6) of this rule shall include the method by which compliance with this rule shall be achieved, a description of new equipment to be installed or modifications to existing equipment to be made, and a timetable that specifies, at a minimum, all of the following dates:

- (a) The date or dates equipment shall be ordered.
- (b) The date or dates construction, modification, or process changes shall begin.
- (c) The date or dates initial start-up of equipment shall begin.
- (d) The date or dates final compliance shall be achieved.

(8) A person responsible for the operations of the kilns may discontinue the operation of the control system, which is used to achieve compliance with the emission limits in this rule between October 1 and April 30, unless the control system is used to achieve compliance with, or if required by, any of the following:

- (a) Any other provisions of these rules.
- (b) A permit to install.
- (c) A permit to operate.
- (d) A voluntary agreement.
- (e) A consent order.
- (f) An order of the department.

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**NOTICE OF PUBLIC HEARING**

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SOAHR 2006-043  
NOTICE OF PUBLIC HEARING  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION

The Michigan Department of Environmental Quality (DEQ), Air Quality Division, will conduct a second public hearing on a proposed administrative rule promulgated pursuant to Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451); R 336.1640. This proposed new rule will limit volatile organic compound emissions at a cement manufacturing facility.

The public hearing will be held on September 27, 2007, at 7:00 p.m., in the Dundee Middle School Cafeteria, 420 Ypsilanti Street, Dundee, Michigan. Prior to the hearing, an informational session will be held from 6:30 p.m. until 7:00 p.m. in the Middle School Cafeteria. The DEQ staff will provide a brief introduction regarding the proposed rule and will be available to answer questions. The public hearing will immediately follow.

Copies of the proposed rule (SOAHR 2006-043EQ) can be downloaded from the Internet at: <http://www.michigan.gov/deqair>. This rule can also be downloaded from the Internet through the State Office of Administrative Hearings and Rules at <http://www.michigan.gov/orr>. Copies of the rule may also be obtained by contacting the Lansing office at:

Air Quality Division  
Michigan Department of Environmental Quality  
P.O. Box 30260  
Lansing, Michigan 48909-7760  
Phone: 517-373-7045  
Fax: 517-241-7499  
E-Mail: [halbeism@Michigan.gov](mailto:halbeism@Michigan.gov)

All interested persons are invited to attend and present their views. It is requested that all statements be submitted in writing for the hearing record. Anyone unable to attend may submit comments in writing to the address above. Written comments must be received by 5:00 p.m. on September 28, 2007. Persons needing accommodations for effective participation in the meeting should contact the Air Quality Division at 517-373-7045 one week in advance to request mobility, visual, hearing, or other assistance.

This notice of public hearing is given in accordance with Sections 41 and 42 of Michigan's Administrative Procedures Act, 1969 PA 306, as amended, being Sections 24.241 and 24.242 of the Michigan Compiled Laws. Administration of the rule is by authority conferred on the Director of the DEQ by Sections 5503 and 5512 of Act 451, being Sections 324.5503 and 324.5512 of the Michigan Compiled Laws, and Executive Order 1995-18. This rule will become effective immediately after filing with the Secretary of State.

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**PROPOSED ADMINISTRATIVE RULES**

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SOAHR 2006-063

DEPARTMENT OF ENVIRONMENTAL QUALITY

WASTE AND HAZARDOUS MATERIALS DIVISION

STORAGE AND HANDLING OF LIQUEFIED AND GASEOUS HYDROGEN SYSTEMS

Filed with the Secretary of State on  
These rules take effect 7 days after filing with the Secretary of State

(By authority conferred on the department of environmental quality by section 3c of 1941 PA 207, MCL 29.3c, and Executive Reorganization Order No. 1998-2, MCL 29.461)

Draft August 21, 2007

R 29.7001, R 29.7002, and R 29.7010, R 29.7011, R 29.7012, R 29.7013, R 29.7014, R 29.7015, R 29.7016, R 29.7017, R 29.7018, R 29.7019, R 29.7020, R 29.7021, R 29.7022, R 29.7023, R 29.7024, R 29.7025, R 29.7026, R 29.7027, R 29.7028, R 29.7029, R 29.7030, R 29.7031, R 29.7032, R 29.7033, R 29.7034, R 29.7035, R 29.7036, R 29.7037, R 29.7038, R 29.7039, R 29.7040, R 29.7041, R 29.7042, R 29.7043, R 29.7044, R 29.7045, R 29.7046, R 29.7047, R 29.7048, R 29.7049, R 29.7050, R 29.7051, R 29.7052, R 29.7053, R 29.7054, R 29.7055, R 29.7056, R 29.7057, R 29.7058, R 29.7059, R 29.7060, R 29.7061, R 29.7062, R 29.7063, R 29.7064, R 29.7065, R 29.7066, R 29.7067, R 29.7068, R 29.7070, R 29.7071, R 29.7072, R 29.7073, R 29.7074, R 29.7075, R 29.7076, R 29.7077, R 29.7078, R 29.7079, R 29.7080, R 29.7081, R 29.7082, R 29.7083, R 29.7084, R 29.7085, R 29.7086, R 29.7087, R 29.7088, R 29.7089, R 29.7090, R 29.7091, R 29.7092, R 29.7093, R 29.7094, R 29.7095, R 29.7096, R 29.7097, R 29.7098, R 29.7099, R 29.7100, R 29.7101, R 29.7102, R 29.7103, R 29.7104, R 29.7105, R 29.7106, R 29.7107, R 29.7108, R 29.7109, R 29.7110, R 29.7111, R 29.7112, R 29.7113, R 29.7114, R 29.7115, R 29.7116, R 29.7117, R 29.7118, R 29.7119, R 29.7120, R 29.7121, R 29.7122, R 29.7123, R 29.7124, R 29.7125, R 29.7126, and R 29.7127 of the Michigan Administrative Code are added to read as follows:

**PART 1. GENERAL PROVISIONS**

R29.7001 Applicability.

Rule 1. These rules apply to the operation of all liquefied and gaseous hydrogen systems. A person shall comply with these rules, other applicable state and federal statutes, and rules and regulations promulgated under the statutes.

R 29.7002 Storage and handling of liquefied and gaseous hydrogen; adoption of standard by reference.

Rule 2. The national fire protection association's (NFPA) Pamphlet 50A, "Standard for Gaseous Hydrogen Systems at Consumer Sites," 1999 edition and NFPA Pamphlet 50B, "Standard for Liquefied Hydrogen Systems at Consumer Sites," 1999 edition, referred to in these rules as the "code," pertaining to the storage and handling, but not transportation, of liquefied and gaseous hydrogen, are adopted by

reference as part of these rules. Copies of the adopted code are available for inspection at the office of the Department of Environmental Quality, Waste and Hazardous Materials Division, Storage Tank Unit, P.O. Box 30241, Lansing, Michigan 48909-7741, or for purchase from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269, telephone number 800-344-3555. The cost of the code, at the time of the adoption, is \$28.00 each, plus a \$7.95 handling charge, per copy; or at the office of the Department of Environmental Quality, Waste and Hazardous Materials Division, Storage Tank Unit, P.O. Box 30241, Lansing, Michigan 48909-7741, for a cost, at the time of the adoption of these rules, of \$35.95, per copy, plus \$20.00 handling, plus shipping.

## PART 2. AMENDMENTS TO THE LIQUEFIED GASEOUS HYDROGEN CODE

### Chapter 1 Storage and handling of gaseous hydrogen NFPA 50A

R 29.7010 Chapter 1 General information.

Rule 10. Sections 1-1 to 1-1.2 of the storage and handling of liquefied and gaseous hydrogen code are added as follows:

1-1 Scope. This standard covers the requirements for the design, siting, construction, installation, operation, maintenance, and dispensing from a gaseous hydrogen system.

Nothing in this hydrogen code shall be intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, environmental protection capability, or safety over those prescribed by this hydrogen code, if technical documentation is submitted to the department to demonstrate equivalency and the system, method, or device is approved for the intended purpose.

This code shall apply to the design and installation of compressed H<sub>2</sub> dispensing systems.

*Exception: Dispensing to rail and aircraft.*

R 29.7011 Classification.

Rule 11. Section 1-2 is reproduced from NFPA 50A as follows:

1-2 Classification. Systems are classified according to the total volume of hydrogen, including unconnected reserves, as follows:

- (a) Less than 3500 scf (99 m<sup>3</sup>), except as covered in 1-3.1
- (b) From 3500 (99 m<sup>3</sup>) to 15,000 scf (425 m<sup>3</sup>)
- (c) In excess of 15,000 scf (425 m<sup>3</sup>)

R 29.7012 Application.

Rule 12. Section 1-3.2 is reproduced from NFPA 50A, and sections 1-3, 1-3.1, 1-3.3, 1-3.4, and 1-3.5 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

#### **1-3 Application.**

**1-3.1 The application of this standard at places of public assembly shall meet the requirements of section 3-2.2(a) and the approval of the department.**

1-3.2 This standard shall not apply to single systems using containers having a total H<sub>2</sub> content of less than 400 scf (11 m<sup>3</sup>). Where individual systems, each having a total H<sub>2</sub> content of less than 400 scf (11 m<sup>3</sup>), are located less than 5 ft (1.5 m) from each other, this standard shall apply.

**1-3.3 This standard does not apply to flow-through process containers.**

1-3.4 H<sub>2</sub> introduced into any system covered by this code shall have a leak detection system acceptable to the department and based on the best interest of public health, safety, and welfare and the environment.

1-3.5 Gaseous H<sub>2</sub> in fuel tanks on vehicles and mobile equipment shall not be included in determining the maximum allowable quantities.

R 29.7013 Retroactivity.

Rule 13. Sections 1-4 and 1-4.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

**1-4 Retroactivity.**

1-4.1 The provisions of this H<sub>2</sub> code are necessary to provide a reasonable level of protection from loss of life and property from fire and explosion. The provisions shall reflect situations and the state of the art prevalent when the H<sub>2</sub> code was issued. Unless otherwise noted, it is not intended that the provisions of this H<sub>2</sub> code be applied to facilities, equipment, structures, or installations that were existing or approved for construction or installation before the effective date of this H<sub>2</sub> code, except in those cases where it is determined by the department that the existing situation involves a distinct hazard to public health, safety, adjacent property, or the environment.

R 29.7014 Definitions.

Rule 14. Section 1-5 of the storage and handling of liquefied and gaseous H<sub>2</sub> code is added, and Section 1-5.1 is reproduced from NFPA 50A as follows:

**Definitions.**

“ANSI” means the american national standards institute.

“Approved” means acceptable to the department.

“ASME” means the american society of mechanical engineers.

“Authority having jurisdiction” means the department.

“Automatic emergency shutoff valve” means a designated fail-safe automatic closing valve designed to shutoff the flow of gases or liquids that is initiated by a control system where the control system is activated by either manual or automatic means.

“Bulk storage” means a single container or containers, where all containers draw down at the same time.

“Cargo transport container” means a mobile unit designed to transport gaseous or liquefied H<sub>2</sub>.

“Cascade storage system” means storage in containers or cylinders arranged in banks where each bank acts as 1 large container. The banks are separated by switching valves to provide sequential drawdown of the banks. The bank may consist of 1 or more containers or cylinders.

“Cathodic protection” means a technique to prevent the corrosion of a metal surface by making the surface the cathode of an electrochemical cell. This protection renders a metallic container or piping component negatively charged with respect to its environment. This protection shall be designed by a corrosion expert as defined by these rules.

“Cathodic protection tester” means a person who can demonstrate an understanding of the principles and measurements of all common types of cathodic protection systems applicable to metal piping and container systems and who has education and experience in soil resistivity, stray current, structure-to-soil potential, and component electrical isolation measurements of metal piping and container systems. The person shall be certified as being qualified by the national association of corrosion engineers (NACE) international.

“Composite container” means a container fabricated of 2 or more materials that interact to facilitate the container design criteria.

“Compression discharge pressure” means the varying pressure at the point of discharge from the compressor.

“CGA” means the compressed gas association.

“Container” means a pressure vessel or cylinder used to store H<sub>2</sub>.

“Container appurtenances” means devices connected to container openings for safety, control, or operating purposes.

“Container system” means a container or combination of containers and all attached appurtenances, valves, and piping.

“Container valve” means a valve connected directly to the container outlet.

“Continuous gas detection system” means a gas detection system in which the instrument is maintained in continuous operation.

“Corrosion expert” means a person who, by reason of thorough knowledge of the physical sciences and the principals of engineering and mathematics acquired by a professional education and related practical experience, is qualified to engage in the practice of corrosion control of container systems. The person shall be certificated as being qualified by NACE, as a senior corrosion technologist, a cathodic protection specialist, or a corrosion specialist or be a registered engineer who has certification and licensing that includes education and experience in corrosion control.

“Corrosion protection” means protecting a container system to prevent the degradation of the metal through oxidation or reactivity with its environment.

“Cylinder” means a container constructed in accordance with the United States Department of Transportation (U.S. DOT) specifications, title 49, code of federal regulations (CFR), parts 171-190.

“Department” means the department of environmental quality.

“Director” means the director of the department of environmental quality.

“Dispensing station” means an H<sub>2</sub> installation that dispenses H<sub>2</sub> from storage containers into fuel supply containers or into portable cylinders by means of a compressor, reformer, vaporizer, or pressure booster.

“Emergency shutdown device (ESD)” means a device that closes all fueling operations within the fueling facility from either local or remote locations.

“Excess flow control” means to limit or stop the flow of H<sub>2</sub> gas from a source of supply when there is a rupture, break, or ‘open valve to atmosphere’ condition that may present a hazard to personnel or the environment.

“Fail-safe” means a design feature that provides for the maintenance of safe operating conditions in the event of a malfunction of control devices or an interruption of an energy source.

“Fast fill station” means a storage and dispensing system designed to fill motor vehicle fuel tanks with compressed, gasified H<sub>2</sub>. The vehicle fuel tank is filled by connecting to a system designed to provide a fuel fill rate above 12 scfm.

“Fixed liquid level device” means a device that indicates when the container is filled to its maximum permitted liquid filling volume.

“Flow-through process container” means a container that forms an integral part of a production process through which there is a steady, variable, recurring, or intermittent flow of materials during the operation of the process and the container is utilized to carry out or control the heating, cooling, mixing, blending, separating, metering, or chemical reaction of materials. The processing is done on a regular basis and it is the primary function of the container. A flow-through process container does not include a container that is used for the storage of materials before its introduction into the production process or for the storage of finished products or by-products from the production process or a container that is only used to recirculate materials.

“Fuel dispenser system” means all the pumps, meters, piping, hose, and controls used for the delivery of fuel.

“Fueling connector” means a mating device at the refueling station, including shutoff valves that connect the fueling dispenser hose to the vehicle fuel filling system receptacle for the transfer of liquid or vapor.

“Gallon water capacity (wc)” means the amount of water in gallons at 60 degrees Fahrenheit (15 degrees Celsius) required to fill a container.

“Gas detection system” means a grouping of 1 or more sensors capable of detecting an H<sub>2</sub> leak at specified concentrations and activating alarms and safety systems.

“Gaseous H<sub>2</sub> system” means a system in which the H<sub>2</sub> is delivered, stored, and discharged in the gaseous form including the piping system. The gaseous H<sub>2</sub> system terminates at the point where the H<sub>2</sub> is dispensed.

“Hydrogen (H<sub>2</sub>)” means the simplest and lightest element in the known universe, which exists as a gas except at low cryogenic temperatures. H<sub>2</sub> gas is a colorless, odorless and highly flammable gas when mixed with oxygen over a wide range of concentrations. H<sub>2</sub> forms water when combusted, or when otherwise joined with oxygen, as within a fuel cell.

“Hydrogen code” means the storage and handling of gaseous and liquefied H<sub>2</sub> rules as promulgated by the department.

“Hydrogen gas vehicle (HGV) or vehicle” means a self-propelled device on land, in, on, or by which any person or property is or may be transported or drawn upon, except for a device exclusively moved by human power, and which has the capability to use H<sub>2</sub> gas as an engine fuel.

“Ignition source” means any item or substance capable of an energy release of type and magnitude sufficient to ignite any flammable mixture of gases or vapors that could occur at the site.

“kPa” means absolute pressure in kilo-Pascals.

“kPag” means gauge pressure in kilo-Pascals.

“Labeled” means equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the department and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with accepted or approved standards of construction and or performance.

“Listed” means equipment, materials, or services included in a list published by an organization that is acceptable to the department and concerned with evaluation of products or services, that maintains periodic inspection of production listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

“Manifolded storage system” means storage in containers arranged in banks where each bank acts as 1 large container. The banks are separated by switching valves to provide sequential drawdown of the banks. The bank may consist of 1 or more containers.

“Manual emergency shutoff valve” means a designated valve designed to shutoff flow due to a rupture in pressurized piping system.

“Maximum allowable working pressure (MAWP)” means the maximum pressure to which any component or portion of the pressure system can be subjected.

“Maximum operating pressure” means the steady-state gauge pressure at which a part or system normally operates.

“Metal hydride storage system” means a system for the storage of H<sub>2</sub> gas absorbed in solid material.

“Motor fuel dispensing facility” means that portion of the property where H<sub>2</sub> is stored and dispensed from fixed equipment into the fuel tanks of motor vehicles, marine craft, or into approved containers, including all equipment used in connection therewith.

“NACE” means the national association of corrosion engineers, international.

“Original equipment manufacturer (OEM)” means an original equipment motor vehicle manufacturer that certifies that the motor vehicle complies with applicable federal motor vehicle safety codes.

“Partially buried container” means a container that has part of, but less than 100%, of the container surface covered with earth.

“Point of transfer” means the point where the transfer connection is made.

“Portable container” means a container designed to be moved readily, as distinguished from containers designed for stationary installations. Portable containers, designed for transportation with H<sub>2</sub>, filled to their maximum filling limit, include “cylinders,” “cargo tanks,” and “portable tanks,” all 3 of which are defined separately. Containers designed to be readily moved from 1 usage location to another, but substantially empty of product, are “portable storage containers” and are defined separately.

“Portable storage container” means a container similar to those designed and constructed for stationary installation, designed so that it can be moved readily over the highways, substantially empty of H<sub>2</sub>, from 1 usage location to another. Such containers either have legs or other supports attached, or are mounted on running gear, such as trailer or semitrailer chassis, with suitable supports that can be of the fold-down type, allowing them to be placed or parked in a stable position on a reasonably firm and level surface. For large-volume, limited-duration product usage, such as at construction sites and normally for 6 months or less, portable storage containers function in lieu of permanently installed stationary containers.

“Portable tank, or skid tank” means a container of more than 1,000 lb (454 kilogram) water capacity used to transport H<sub>2</sub>, handled as a package, that is, filled to its maximum permitted filling limit. Such containers are mounted on skids or runners and have all container appurtenances protected in such a manner that they can be safely handled as a package.

“Pressure relief device” means a pressure or temperature activated device used to prevent pressure from rising above a specified value and thereby prevent the rupture of a normally charged pressure vessel or a cylinder due to emergency or abnormal conditions.

“Pressure vessel” means a container or other component designed in accordance with the ASME code.

“psi” means pounds per square inch.

“psia” means pounds per square inch, absolute.

“psig” means pounds per square inch gauge.

“Rated pressure” means the pressure to which a component is rated provided that the MAWP is observed for temperature extremes.

“Release” means an unexpected discharge of H<sub>2</sub>.

“Remotely located manually activated shutdown control” means a control system that is designed to initiate shut down of the flow of gas or liquid that is manually activated from a point located some distance from the delivery system.

“Residential fueling facility” means a listed vehicle fueling appliance used for the compression and delivery of H<sub>2</sub> into vehicles at a residence which includes its associated equipment and piping.

“Service pressure” means the nominal gas pressure at a uniform gas temperature of 70 degrees Fahrenheit (21 degrees Celsius) when the equipment is properly and completely charged with gas; the nominal design pressure for which the equipment has been constructed.

“Set pressure” means the start-to-discharge pressure for which a relief valve is set and marked.

“Standard cubic foot per minute (scfm)” means the amount of airflow per volume in standard cubic feet per minute compensated for pressure and temperature.

“Substantially empty” means a gas container of H<sub>2</sub> when the residual gas pressure is less than 10% of the maximum allowable working pressure of the vessel.

“Vehicle-fueling appliance” means a self-contained listed assembly used for the compression and delivery of H<sub>2</sub> gas into vehicles including associated equipment and piping of the appliance.

1-5.1 NFPA official definitions.

Combustible Liquid. A liquid having a closed-cup flash point at or above 100° F (37.8°C) and are subdivided as follows:

(a) Class II liquids include those having a flash point at or above 100°F (37.8°C) and below 140°F (60°C).

(b) Class IIIA liquids include those having a flash point at or above 140°F (60°C) and below 200°F (93.4°C).

(c) Class IIIB liquids include those having a flash point at or above 200°F (93.4°C).

Flammable Liquid (Class I). Any liquid having a closed-cup flash point below 100°F (37.8°C) and having a vapor pressure not exceeding 40 psia (276 kPa) at 100°F (37.8°C).

Gallon. A standard U.S. gallon.

Limited-Combustible Material. A material, as defined in NFPA 220, *Standard on Types of Building Construction*, not complying with the definition of noncombustible material that, in the form in which it is used, has a potential heat value not exceeding 3500 Btu/lb (8141 kJ/kg) and complies with one of the following paragraphs (a) or (b). Materials subject to an increase in combustibility or flame spread rating, beyond the limits herein established, through the effects of age, moisture, or other atmospheric condition are considered combustible.

(a) Materials having a structural base of noncombustible material, with a surfacing not exceeding a thickness of  $\frac{1}{8}$  in. (3.2 mm) that has a flame spread rating not greater than 50.

(b) Materials, in the form and thickness used, other than as described in (a), having neither a flame spread rating greater than 25 nor evidence of continued progressive combustion and of such composition that surfaces that would be exposed by cutting through the material on any plane would have neither a flame spread rating greater than 25 nor evidence of continued progressive combustion.

Noncombustible Material. A material, as defined in NFPA 220, *Standard on Types of Building Construction*, that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat. Materials reported as noncombustible, when tested in accordance with ASTM E 136, *Standard Method of Test for Behavior of Materials in a Vertical Tube Furnace at 750°C*, are considered noncombustible materials.

Outdoors. Location outside of any building or structure or locations under a roof, weather shelter, or canopy provided this area is not enclosed on more than two sides.

Separate Building. A detached, noncommunicating building used exclusively to house a hydrogen system.

Shall. Indicates a mandatory requirement.

Special Room. A separate enclosed area that is part of or attached to another building and is used exclusively for an H<sub>2</sub> system.

Standard. A document, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions shall be located in an appendix, footnote, or fine-print note and are not to be considered a part of the requirements of a standard.

Standard Cubic Foot (scf). One cubic foot of gas at 70°F (21°C) and 14.7 psia (an absolute pressure of 101 kPa).

R 29.7015 Equivalency.

Rule 15. Sections 1-6 to 1-6.3 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

1-6 Equivalency.

1-6.1 Nothing in this H<sub>2</sub> code shall be intended to prevent the use of systems, methods, or devices having equivalent or superior quality, strength, fire resistance, effectiveness, durability, environmental protection capability, or safety over those prescribed by the H<sub>2</sub> code, if technical documentation is submitted to the department to demonstrate equivalency and the system, method, or device is approved for the intended purpose.

1-6.2 An owner or operator may make an application for a variance of rules by applying to the department with a satisfactory explanation of why compliance is not possible. The department may approve the variance request upon finding that the variance is based upon the best interest of public health, safety, and welfare and the environment.

1-6.3 A person aggrieved by a final decision of the department on a request for variance or an equivalency determination may appeal to the circuit court within 21 days of receiving the decision.

R 29.7016 Prohibitions.

Rule 16. Sections 1-7 to 1-7.4 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

1-7 Prohibitions.

Any H<sub>2</sub> storage container system or practice that is not in compliance with these rules shall be considered to be in violation of these rules.

Upon notification by the department, a person shall not deliver H<sub>2</sub> to a storage container system under any circumstances that are prohibited by these rules or if a container is not in compliance with these rules. Such notification may include a verbal or written communication or an affixed written notification on the H<sub>2</sub> system.

A person shall not tamper with, remove, or disregard written notification affixed to the storage container system.

An owner or operator shall not continue to use a storage container system that is causing a release and shall expeditiously empty the system or the component that is causing the release until the system is repaired or replaced.

R 29.7017 Installation application.

Rule 17. Sections 1-8 to 1-8.4 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

1-8 Installation application.

An application for plan review shall be submitted, on a form provided by the department, by the owner or owner's designee on behalf of the owner to the department not less than 30 days before the installation of an H<sub>2</sub> storage container system.

The installation application shall include all of the following information:

(a) A plot map showing all of the following within 100 feet (30.5 meters) of any portion from the container system:

The location of the following:

Buildings.

Public roadways.

Railroad mainlines.

Public sidewalks.

Overhead power lines.

The proposed location of the dispensing station.

The location of property lines.

The locations of existing aboveground and underground tanks storing flammable and combustible liquids, and flammable, compressed or liquefied gases.

The location of the point of transfer in relationship to all of the following:

The container.

Buildings.

Public ways.

Outdoor places of public assembly.

Driveways.

Main line railroad track center lines.

The line of adjoining property that may be built upon.

Aboveground and underground tanks storing flammable and combustible liquids and/or flammable, compressed, or liquefied gases.

The construction material, the dimensions and the capacity of each container.

The type of container venting and pressure relief.

The compressor(s) size (psig and scfm).

Container appurtenances.

A piping diagram showing sizes, valves, pressure relief and fittings, and control devices.

Upon acknowledged receipt of the plans, the department shall issue a plan review report within 30 days.

If the plan review report is not issued within 30 days, the installation may be constructed according to the submitted plans and shall comply with these rules.

An applicant shall notify the department upon completion of the installation before the installation is placed into service. The department shall inspect the installation after receiving notification and shall certify the installation, if the requirements of the rules are met. If the inspection is not made within 2 working days, then the applicant may place the installation into service, or if intended to be underground, mounded, or partially underground, may cover the installation from sight, and shall notify the department, and shall submit a notarized affidavit to the department attesting to the fact that the installation complies with the installation application submitted and the applicable rules.

Upon the owner's request, all plans and specifications that are submitted to the department for review shall be returned after the department has certified the installation or within 30 working days after notification to the department of the completion of the installation. Plans and specifications may be marked "*Confidential—Do Not Copy*" at the time they are submitted.

R 29.7018 Installation application fees and annual certification.

Rule 18. Sections 1-9 to 1-9.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

1-9 Installation application fees and annual certification.

Only an owner of an H<sub>2</sub> container system for which an installation application is required to be submitted under section 1-8 of the H<sub>2</sub> code shall be required to pay fees as specified in section 5 of 1941 PA 207, MCL 29.5.

1-9.2 For the purpose of assessing fees on permanent installations, each 26,000 scf storage capacity of H<sub>2</sub> or increment thereof, shall be considered a container or any container filling location, as used in section 5 of 1941 PA 207, MCL 29.5.

R 29.7019 Personnel.

Rule 19. Sections 1-10 to 1-10.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Personnel.

In the interest of safety, all persons involved in handling H<sub>2</sub> shall be trained in the proper handling and operating procedures. This training shall be acceptable to the department.

*Exception: This training is not required for a person dispensing H<sub>2</sub> into a vehicle at an attended self-service facility.*

## **Chapter 2 Design of gaseous hydrogen systems**

R 29.7020 Containers.

Rule 20. Section 2-1.3 is reproduced from NFPA 50A, and sections 2-1, 2-1.1, 2-1.2, and 2-1.4 to 2-1.8.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

### **2-1 Containers.**

#### **2-1.1 H<sub>2</sub> containers shall comply with 1 of the following:**

- (a) Designed, constructed, and tested in accordance with appropriate requirements of ASME International, “*Boiler and Pressure Vessel Code*,” Section VIII, “Rules for the construction of pressure vessels,” adopted by reference in section 8-1.
- (b) Designed, constructed, tested, and maintained in accordance with Title 49, CFR.
- (c) Metal hydride storage systems shall be listed for the application and designed in a manner that prevents the removal of the metal hydride.
- (d) Welding or brazing for the repair or alteration of an ASME pressure vessel shall comply with the standard adopted in section 8-1.2.1.
- (e) Other welding or brazing shall be permitted only on saddle plates, lugs, or brackets which are attached to the pressure vessel by the pressure vessel manufacturer.
- (f) The exchange or interchange of pressure vessel appurtenances intended for the same purpose shall not be considered a repair or alteration and appurtenances must comply with these rules.

#### **2-1.2 Permanently installed aboveground containers shall be provided with substantial supports, constructed of noncombustible material on firm foundations of noncombustible material, and shall comply with the following subsections as applicable:**

- (a) Steel supports in excess of 18 inches (45.72 centimeters) in height, shall have a minimum 2-hour fire resistance rating, see figure 2-1.2.

*Exception: Supports may be greater than 18 inches (45.72 centimeters) if owner demonstrates, to the satisfaction of the department, that the container will not be exposed to a 2-hour pool fire.*

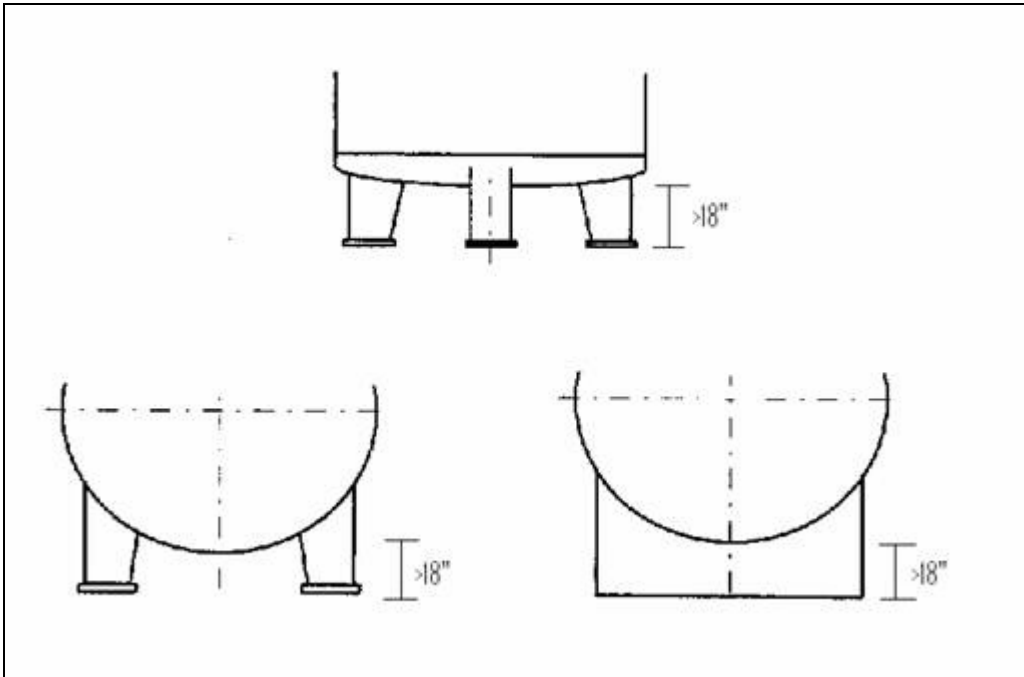
- (b) If a permanently installed aboveground container is in an area that is subject to buoyant forces, provision shall be made to prevent the container, either full or empty, from floating during a rise in water level, including up to the established maximum flood stage.
- (c) Horizontally installed containers shall have not more than 2 points of support longitudinally or other methods approved by the department based on the best interest of public health, safety, and welfare and the environment.
- (d) Horizontally installed containers shall not be in direct contact with each other.

(e) Composite containers shall be protected from UV radiation as required in the manufacturer's specifications.

(f) Aboveground containers shall be protected by painting or other equivalent means where necessary to inhibit corrosion.

*Exception: Composite containers shall not be painted without prior permission from the container manufacturer.*

Figure 2-1.2



**Each portable container shall be legibly marked with the name hydrogen in accordance with ANSI/CGA C-4, *Method of Marking Portable Compressed Gas Containers to Identify the Material Contained*. Each manifold hydrogen supply unit shall be legibly marked with the name hydrogen or a legend such as “This unit contains hydrogen.”**

An owner or operator that has had a container subjected to heat exposure due to fire shall remove the container from service, unless the owner or operator provides documentation of recertification in accordance with section 2-1.1, to the department substantiating container integrity.

2-1.5 Guard posts or other approved means shall be provided to protect a container system subject to vehicular damage. When guard posts are installed, all of the following design specifications shall be met:

- (a) Guard posts shall be constructed of steel not less than 4 inches (10.16 centimeters) in diameter and shall be filled with concrete.
- (b) Guard posts shall be spaced not more than 4 feet (1.2 meters) on center.
- (c) Guard posts shall be set not less than 4 feet (1.2 meters) deep in a concrete footing that is not less than 15 inches (38.1 centimeters) in diameter.
- (d) Guard posts shall be not less than 4 feet (1.2 meters) in height above grade.
- (e) Other means as approved by the department based on the best interests of public health, safety, and welfare and the environment.

2-1.6 Physical protection. Containers, piping, valves, pressure-relief devices, regulating equipment, and other appurtenances shall be protected against physical damage and tampering.

Portable containers subject to shifting or upset shall be secured. Nesting may be used to secure portable containers.

Underground containers. Underground containers for the storage of liquefied H<sub>2</sub> shall be in accordance with this subsection.

Construction. Storage containers for gaseous H<sub>2</sub> shall be designed and constructed in accordance with Section VIII of ASME International, “*Boiler and Pressure Vessel Code*,” adopted by reference in section 8-1, and shall be vacuum-jacketed in accordance with section 2-1.10.1.1.

Corrosion Protection. The underground container shall be protected by an engineered corrosion protection system designed by a corrosion expert. If cathodic protection is used the maintenance schedule shall meet the requirements of section 5-4.

R 29.7021 Pressure relief devices.

Rule 21. Section 2-2.3 is reproduced from NFPA 50A, and sections 2-2, 2-2.1, 2-2.2, and 2-2.4 to 2-2.7.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

## **2-2 Pressure relief devices.**

2-2.1 H<sub>2</sub> containers shall be protected from credible overpressure scenarios by a relief device installed in accordance with the ASME International, “*Boiler Pressure Vessel Code*,” section VIII division 1 sections UG 125 through 137, adopted by reference in section 8-1. When all credible overpressure sources are external to the container, the relief device(s) need not be installed directly on the container. In such cases, the relief devices may be installed in the piping between the container and the source(s) of overpressure and a block valve may be installed between the relief device(s) and container.

2-2.2 Pressure relief devices, when installed, shall be arranged to discharge upward and unobstructed to the open air in such a manner as to prevent any impingement of escaping gas upon the container, adjacent structures, or personnel. The vent and piping system from relief device(s) shall be designed and installed in accordance with CGA G-5.5.

2-2.3 Pressure relief devices or vent piping shall be designed or located so that moisture cannot collect and freeze in a manner that would interfere with proper operation of the device.

2-2.4 Pressure relief valves for gaseous H<sub>2</sub> service shall not be fitted with manual relief (lifting devices).

2-2.5 Pressure relief valves for gaseous H<sub>2</sub> systems, if externally adjustable, shall be provided with a means for sealing the adjustment to prevent tampering.

2-2.5.1 If at any time it is necessary to break such a seal, the valve shall be removed from service until it has been reset and sealed in accordance with design, certification, and installation code specified in section 2-2.1.

2-2.6 Pressure relief valves shall be tested at least every 5 years.

*Exception: Non-ASME relief valves used for blocked-in portions of piping as thermal relief valves will not be tested.*

2-2.7 Excess flow control shall be provided for pressurized H<sub>2</sub> piping systems above 15 psig when system design allows their application to add a significant measure of safety for break, rupture, or open valve (to atmosphere) conditions.

2-2.7.1 The location of excess flow control shall be as specified as in either of the following situations:

(a) Where piping originates from a source located in a room or area, the excess flow control shall be located within the same room or area.

(b) Where piping originates from a bulk source, the excess flow control shall be as close to the bulk source as possible.

*Exception: The above requirements shall not apply to piping for inlet connections designed to prevent backflow, piping pressure relief devices, or systems containing 450 scf of H<sub>2</sub> gas or less.*

R 29.7022 Piping, tubing, and fittings.

Rule 22. Sections 2-3.1, and 2-3.2 are reproduced from NFPA 50A, and sections 2-3.1.1, 2-3.1.2, and 2-3.3 to 2-3.13 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

2-3 Piping, tubing, and fittings.

2-3.1 Piping, tubing, and fittings shall be suitable for H<sub>2</sub> service and for the pressures and temperatures involved. Cast-iron pipe and fittings shall not be used.

2-3.1.1 A piping system shall be substantially supported and protected against physical damage and excessive stresses arising from settlement, vibration, expansion, or contraction. Supports for aboveground piping shall be constructed of noncombustible material.

2-3.1.2 Aboveground piping systems shall be protected from corrosion in compliance with recognized standards. Underground piping systems shall be in compliance with section 5-4.

2-3.2 Material specifications and thickness requirements for piping and tubing shall conform to ASME B31.3, “Code for Chemical Plant and Petroleum Refinery Piping,” adopted by reference in section 8-1.

2-3.3 Joints in piping and tubing shall be made by welding, or brazing, or flanged. Brazing materials shall have a melting point above 1,000 degrees Fahrenheit (538 degrees Celsius). Flanged connection shall use a gasket that is suitable for H<sub>2</sub>.

*Exception: Threaded, socket, slip, or compression fittings can be used for outdoor locations or special rooms as defined in section 4-3.*

(a) Tapered pipe threads shall not be used.

(b) Thread sealants, when used, shall be suitable for H<sub>2</sub> service and shall be applied to all tapered male pipe threads prior to assembly.

2-3.4 Aboveground piping systems shall be marked in accordance with the following:

(a) Marking shall include the name of the gas and direction of flow arrow.

(b) Marking for piping systems shall be provided at the following locations:

(i) At each critical process control valve.

(ii) At wall, floor, or ceiling penetrations.

(iii) At each change in direction.

(iv) At a minimum of every 20 feet (6.1 meters) or fraction thereof throughout the piping run.

2-3.5 Threaded or flanged connections shall not be used in areas other than outdoors.

2-3.6 Underground piping shall be installed on a bedding of at least 6 inches (15.24 centimeters) of well-compacted backfill material.

2-3.7 In areas subject to vehicle traffic, the pipe trench shall be of sufficient depth to permit a cover of not less than 18 inches (45.72 centimeters) of well compacted backfill material and pavement.

*Exception 1: In paved areas where a minimum of 8 inches (20.32 centimeters) of asphalt paving is used, the depth of the backfill between the topmost tier of piping and the paving may be reduced to not less than 8 inches (20.32 centimeters).*

*Exception 2: In paved areas where a minimum of 6 inches (15.24 centimeters) of reinforced concrete paving is used, the depth of backfill between the topmost tier of the piping and the paving may be reduced to not less than 4 inches (10.16 centimeters).*

2-3.8 In areas not subject to vehicle traffic, the pipe trench shall be of sufficient depth to permit 6 inches (15.24 centimeters) each of bedding and cover of well-compacted backfill material. A greater burial depth shall be provided when required by the manufacturer’s instructions.

2-3.9 Piping within the same trench shall be separated by more than 3 times the diameter of the larger adjacent pipe.

2-3.10 Piping to equipment shall be provided with an accessible, manual shutoff valve.

2-3.11 Pipe, tubing, fittings, and other piping components shall be capable of withstanding a hydrostatic test of at least 3 times the rated service pressure without structural failure as documented by the manufacturer.

2-3.12 All natural gas piping shall be installed in accordance with R 29.4601 et seq.

2-3.13 All liquefied petroleum gas piping shall be installed in accordance with R 29.4001 et seq.

R 29.7023 Equipment assembly.

Rule 23. Sections 2-4 to 2-4.6 are reproduced from NFPA 50A, and sections 2-4.7 to 2-4.10 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

**2-4 Equipment assembly.**

2-4.1 Valves, gauges, regulators, and other accessories shall be recommended for H<sub>2</sub> service by the manufacturer or the H<sub>2</sub> supplier.

2-4.2 Installation of H<sub>2</sub> systems shall be supervised by personnel familiar with proper practices with reference to their construction and use.

2-4.3 Storage containers, piping, valves, regulating equipment, and other accessories shall be accessible and shall be protected against physical damage and against tampering by the general public.

2-4.4 Cabinets or housings containing H<sub>2</sub> control or operating equipment shall be ventilated to minimize accumulation of H<sub>2</sub>, as adopted directly from NFPA 50A.

2-4.5 Each mobile H<sub>2</sub> supply unit used as part of an H<sub>2</sub> system shall be secured to prevent movement.

2-4.6 Mobile H<sub>2</sub> supply units shall be electrically bonded to the system before discharging H<sub>2</sub>.

2-4.7 Emergency shutoff valves shall be approved and shall incorporate all of the following means of closing:

(a) Automatic shutoff through thermal (fire) actuation. Where fusible elements are used, they shall have a melting point not exceeding 250 degrees Fahrenheit (121 degrees Celsius).

(b) Manual shutoff from a remote location.

(c) Manual shutoff at the installed location.

2-4.8 The fill line, when it is independent of the withdraw line on a storage container, shall be equipped with a backflow check valve located as close as practical to the container to prevent discharge of H<sub>2</sub> from the container in case of the rupture of the line, hose, or fittings.

Where excess-flow check valves are used, the closing flow shall be greater than the maximum system design flow rate and less than the flow rating of the piping system that results from a complete line failure between the excess-flow check valve and the equipment downstream of the excess-flow check valve.

2-4.10 Gas piping from an outdoor compressor or storage system into a building shall be provided with shutoff valves located outside the building. The shutoff valves shall be readily accessible and as close as practical to the building. Each valve shall be permanently identified.

R 29.7024 Marking.

Rule 24. Sections 2-5 to 2-5.4 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

**2-5 Marking. Gaseous H<sub>2</sub> containers and systems shall be marked in accordance with this section.**

**2-5.1 Identification of contents. Each container shall be marked as follows:**

“GASEOUS HYDROGEN - FLAMMABLE GAS”

in letters that are not less than 3 inches (76 millimeters) in height.

Container specification. Stationary containers shall be marked with the manufacturing specification and maximum allowable working pressure on a permanent nameplate in accordance with the standard to which the container was manufactured.

Portable containers. Portable containers shall be marked in accordance with CGA C-7, “*Guide to the Preparation of Precautionary Labeling and Marking of Compressed Gas Containers*,” adopted by reference in section 8-1.

Stationary containers. Stationary containers shall be marked in accordance with NFPA 704, “*Standard Systems for the Identification of the Hazards of Materials for Emergency Response*,” adopted by reference in section 8-1.

#### R 29.7025 Testing.

Rule 25. Section 2-6 is reproduced from NFPA 50A, and section 2-6.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code is added as follows:

2-6 Testing. After installation, all piping, tubing, and fittings shall be tested and proved H<sub>2</sub> gas-tight at maximum operating pressure.

2-6.1 Containers, if out of service in excess of 1 year, shall be inspected and tested as outlined in section 2-6. The pressure relief devices shall be checked to determine if they are operable and properly set.

#### R 29.7026 Approval.

Rule 26. Sections 2-7 and 2-7.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

##### 2-7 Approval.

Systems and all system components shall be listed or approved, including, but not limited to all of the following:

Container.

Pressure relief device, including a pressure relief valve.

Pressure gauge.

Pressure regulator.

Valve.

Hose and hose connection.

Vehicle fueling connection.

Electrical equipment related to the H<sub>2</sub> system.

Dispenser.

Emergency shutoff valves.

(k) Metal hydride storage.

(l) Gas detection equipment and alarms.

(m) H<sub>2</sub> generators.

(n) Pumps or compressor.

(o) Stationary engine fuel system.

#### R 29.7027 Pressure gauges.

Rule 27. Section 2-8 of the storage and handling of liquefied and gaseous H<sub>2</sub> code is added as follows:

2-8 Pressure gauges. A pressure gauge, if provided, shall be capable of reading at least 1.2 times the system MAWP.

R 29.7028 Pressure regulators.

Rule 28. Sections 2-9 to 2-9.3 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

2-9 Pressure regulators.

2-9.1 A pressure regulator inlet and each chamber shall be designed for its service pressure with a safety factor of at least 3.

Pressure chambers shall provide for overpressure relief, if required.

2-9.3 Regulators shall be designed, installed, or protected so that their operation is not affected by freezing rain, sleet, snow, ice, mud, insects, or debris. Regulator protection may be integral with the regulator.

R 29.7029 Valves.

Rule 29. Sections 2-10 to 2-10.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Valves.

2-10.1 Shutoff valves shall have a rated service pressure not less than the rated service pressure of the entire system and shall be capable of withstanding a hydrostatic test of at least 3 times the rated service pressure without rupture.

2-10.1.1 Leakage shall not occur when tested at least 1.1 times the rated service pressure, using an inert gas compatible with industry practices.

Valves of a design that allows the valve stem to be removed without removal of the complete valve bonnet or without disassembly of the valve body shall not be used.

R 29.7030 Hose and hose connections.

Rule 30. Sections 2-11 to 2-11.6 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Hose and hose connections.

Hose shall be constructed of or lined with materials that are resistant to corrosion and compatible with H<sub>2</sub>.

2-11.2 Hose, metallic hose, flexible metal hose, tubing, and their connections shall be designed for the most severe pressures and temperatures expected under normal operating conditions with a burst pressure of at least 3 times the service pressure.

2-11.3 Prior to use, hose assemblies shall be tested by the manufacturer or its designated representative at a pressure at least 1.1 times the service pressure.

2-11.4 Hose and metallic hose shall be distinctly marked by the manufacturer either by the manufacturer's permanently attached tag or by distinct markings indicating the manufacturer's name or trademark, applicable service identifier and design pressure.

The use of hose in an installation shall be limited to only the following applications:

Vehicle fueling hose.

Inlet connection to compression equipment.

Section of metallic hose not exceeding 36 inches in length in the pipeline to provide flexibility where necessary.

2-11.6 Each section shall be so installed that it is protected against mechanical damage and is readily visible for inspection.

R 29.7031 Vehicle fueling connection.

Rule 31. Sections 2-12 to 2-12.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

2-12 Vehicle fueling connection.

2-12.1 Fueling receptacles and nozzles for gaseous H<sub>2</sub> service shall be listed or approved in accordance with a standard acceptable to the department and based on the best interest of public health, safety, and welfare and the environment.

The use of adapters shall be prohibited.

R 29.7032 Temporary installations.

Rule 32. Sections 2-13 and 2-13.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

2-13 Temporary installations.

2-13.1 ASME or U.S. DOT containers that are used as portable storage containers, see definition of portable container in section 1-5, for temporary, less than 6 months at any given location, stationary service shall comply with the following:

If mounted on legs or supports, then such supports shall be of steel and either shall be welded to the container by the manufacturer at the time of fabrication or shall be attached to lugs that have been so welded to the container. The legs or supports or the lugs for the attachment of these legs or supports shall be secured to the container in accordance with the code or rule under which the container was designed and built to withstand loading in any direction equal to twice the weight of the empty container and attachments.

If the container is mounted on a trailer or semi-trailer running gear so that the unit can be moved by a conventional over-the-road tractor, then attachment to the vehicle, or attachments to the container to make it a vehicle, shall comply with the appropriate U.S. DOT requirements for cargo tank service. The unit also shall comply with applicable state and U.S. DOT motor carrier regulations and shall be approved by the department.

### **Chapter 3 Location of gaseous hydrogen systems**

R 29.7033 General requirements.

Rule 33. Sections 3-1.1, and 3-1.4 are reproduced from NFPA 50A, and sections 3-1.2, 3-1.3, and 3-1.5 to 3-1.10 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

#### **3-1 General requirements.**

3-1.1 The system shall be located so that it is accessible to delivery equipment and to authorized personnel. Roadways or other means of access for emergency equipment, such as fire department apparatus, shall be provided.

Above ground systems shall be located either at grade or above grade.

#### **3-1.3 Aboveground systems shall not be located beneath or where exposed to failure of the following:**

(a) Electric power lines as follows:

(i) Not less than 50 feet (15.24 meters) horizontally from the vertical plane below the nearest overhead wire of an electric trolley, train, or bus line.

(ii) Not less than 5 feet (1.52 meters) horizontally from the vertical plane below the nearest overhead electrical wire.

(b) Piping containing all classes of flammable or combustible liquids, see definition in Section 1-5.

(c) Piping containing oxidizing materials.

**Systems within 50 feet (15.24 meters) of aboveground storage of all classes of flammable and combustible liquids shall be located on ground higher than such storage, except where dikes, diversion curbs, grading, or separating solid walls are used to prevent accumulation of these liquids under the system.**

Underground systems shall be located underground, mounded, or partially buried and outside of any buildings. Buildings shall not be constructed over any underground, mounded, or partially buried container. Sides of adjacent containers shall be separated by not less than 3 feet (1 meter) unless approved by the department.

(a) Excavation for underground, mounded, or partially buried containers shall be made with due care to avoid damage to an existing structure or its foundation. Containers shall not be installed where loads from adjacent structures may be transmitted to the container. A structure or foundation of a structure on the same property shall not be erected or constructed within 10 feet (3.1 meters) of any point on the container surface, unless the footings extend to the bottom of the container. A container shall not be installed less than 10 feet (3.1 meters) from the nearest wall of any basement, pit, or property line.

All underground containers shall be set on firm foundation and surrounded with 6 inches (15.24 centimeters) minimum of noncorrosive inert material such as clean sand or pea gravel.

Underground or mounded containers shall be covered with not less than 2 feet (0.6 meter) of earth or with not less than 1 foot (30.48 centimeters) of earth on top of which shall be placed a reinforced concrete slab not less than 4 inches (10.16 centimeters) thick. If containers are likely to be subjected to traffic, they shall be protected against damage from vehicles passing over them by at least 3 feet (1 meter) of earth cover plus 6 inches (15.24 centimeters) of reinforced concrete. When reinforced concrete paving is used as part of the protection, it shall extend at least 1 foot (30.48 centimeters) horizontally beyond the outline of the container in all directions

Containers installed in an area subject to flooding, high water table, or other buoyant forces shall be safeguarded from movement by anchoring or other means acceptable to the department based on the best interests of public health, safety, and welfare and the environment.

Aboveground gaseous H<sub>2</sub> systems shall be fenced and posted to prevent entrance by unauthorized personnel.

*Exception: Gaseous H<sub>2</sub> dispensers may be located outside the fence.*

Underground installations shall be deemed to provide engineered protection from overhead power lines.

R 29.7034 Specific requirements.

Rule 34. Sections 3-2.1, 3-2.4, 3-2.5, and table 3-2.1 are reproduced from NFPA 50A, and table 3-2.2, sections 3-2.2, 3-2.3 and 3-2.6 to 3-2.9 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

### **3-2 Specific requirements.**

3-2.1 The location of a system, as determined by the maximum total contained volume of H<sub>2</sub>, shall be in the order of preference as indicated by Roman numerals in table 3-2.1.

**Table 3-2.1**

#### **Preferred Locations of Gaseous Hydrogen Systems**

Nature of Location	Size of Hydrogen System		
	Less than 3500 scf (99 m <sup>3</sup> )	3500 scf to 15,000 scf (99 m <sup>3</sup> to 425 m <sup>3</sup> )	In Excess of 15,000 scf (425 m <sup>3</sup> )

Outdoors	I	I	I
In a separate building	II	II	II
In a special room	III	III	Not permitted
Inside buildings not in a special room or exposed to other occupancies	IV	Not permitted	Not permitted

**3-2.2 The minimum distance in feet from an H<sub>2</sub> system of indicated capacity located either outdoors, in separate buildings, or in special rooms to any specified outdoor exposure shall be in accordance with table 3-2.2. The distances in numbers 1, 3 to 10, and 14 inclusive in table 3-2.2 shall not apply where protective structures having a minimum fire resistance rating of 2 hours are located between the system and the exposure.**

**(a) An aboveground H<sub>2</sub> storage container system shall be erected per table 3-2.2, but not less than 75 feet (22.9 meters), from any of the following:**

A school.

A church.

A hospital.

A theater.

Assembly occupancy for 50 or more persons.

*Exception: The restrictions in section 3-2.2(a) shall not apply to an aboveground H<sub>2</sub> system used exclusively for stationary power generation.*

Table 3-2.2

Minimum Distance from Outdoor Gaseous Hydrogen Systems to Exposures

Type of Outdoor Exposure	Total Gaseous Hydrogen Storage		
	Less than 3500 scf (99 m <sup>3</sup> )	3500 scf to 15,000 scf (99 m <sup>3</sup> to 425 m <sup>3</sup> )	In excess of 15,000 scf (425 m <sup>3</sup> )
	Feet (meter)	Feet (meter)	Feet (meter)
1. Building or structure			
(a) Wall(s) adjacent to system constructed of noncombustible or limited-combustible materials	0 <sup>a</sup> (0)	5 <sup>a</sup> (1.5)	5 <sup>a</sup> (1.5)
(1) Sprinklered building or structure or unsprinklered building or structure having noncombustible contents			
(2) Unsprinklered building or structure with combustible contents	0 <sup>c</sup> (0)	10 (3.1)	25 <sup>d</sup> (7.6)
Adjacent wall(s) with fire resistance rating less than 2 hours <sup>b</sup>			
Adjacent wall(s) with fire resistance rating of 2 hours or greater <sup>b</sup>	0 (0)	5 (1.5)	5 (1.5)
(b) Wall(s) adjacent to system			

constructed of other than noncombustible or limited-combustible materials	10 (3.1)	25 (7.6)	50 <sup>d</sup> (15.2)
2. Wall openings			
(a) Not above any part of a system	10 (3.1)	10 (3.1)	10 (3.1)
(b) Above any part of a system	25 (7.6)	25 (7.6)	25 (7.6)
3. All classes of flammable and combustible liquids above ground	10 (3.1)	25 (7.6)	25 (7.6)
(a) 0-1000 gal (3785L)			
(b) In excess of 1000 gal (3785L)	25 (7.6)	50 (15.2)	50 (15.2)
4. All classes of flammable and combustible liquids below ground – 0-100 gal (3785L) <sup>e</sup>	10 (3.1)	10 (3.1)	10 (3.1)
(a) Tank			
(b) Vent or fill opening of tank	25 (7.6)	25 (7.6)	25 (7.6)
5. All classes of flammable and combustible liquids below ground – in excess of 1000 gal (3785L) <sup>e</sup>	20 (6.1)	20 (6.1)	20 (6.1)
(a) Tank			
(b) Vent of fill opening of tank	25 (7.6)	25 (7.6)	25 (7.6)
6. Flammable gas storage (other than H <sub>2</sub> ), either high pressure or low pressure	10 (3.1)	25 (7.6)	25 (7.6)
(a) 0-15,000 scf (255 m <sup>e</sup> ) capacity			
(b) In excess of 15,000 scf (255 m <sup>e</sup> ) capacity	25 (7.6)	50 (15.2)	50 (15.2)
7. Oxygen storage	Refer to NFPA 51, <i>Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes</i>		
(a) 20,000 scf (566 m <sup>e</sup> ) or less			
(b) More than 20,000 scf (566 m <sup>e</sup> )	Refer to NFPA 55, <i>Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks</i>		
8. Fast-burning solids such as ordinary lumber, excelsior, or paper	50 (15.2)	50 (15.2)	50 (15.2)
9. Slow-burning solids such as heavy timber or coal	25 (7.6)	25 (7.6)	25 (7.6)
10. Open flames and welding	25 (7.6)	25 (7.6)	25 (7.6)
11. Air compressor intakes or inlets to ventilating or air-conditioning equipment	50 (15.2)	50 (15.2)	50 (15.2)
12. Places of public assembly less than 50 people	25 (7.6)	50 (15.2)	50 (15.2)
13. Public sidewalks and parked vehicles	15 (4.6)	15 (4.6)	15 (4.6)
14. Line of adjoining property that can	5 (1.5)	5 (1.5)	5 (1.5)

be built upon

15. Flammable/Combustible liquid dispenser 10 (3.1) 10 (3.1) 10 (3.1)

16. Public Way, driveway 15 (4.6) 15 (4.6) 15 (4.6)

17. Railroad 50 (15.2) 50 (15.2) 50 (15.2)

<sup>a</sup>Portions of wall less than 10 ft (3m) (measured horizontally) from any part of a system shall have a fire resistance rating of at least ½ hour.

<sup>b</sup>Exclusive of windows and doors (see number 2 of Table 3-2.2).

<sup>c</sup>Portions of walls less than 10 ft (3m) (measured horizontally) from any part of a system shall have a fire resistance rating of at least 1 hour.

<sup>d</sup>But not less than 1/2 the height of adjacent wall of building or structure.

<sup>e</sup>Distances can be reduced to 15 ft (4.5m) for Class IIIB combustible liquids.

3-2.2.1 Loose or piled combustible material and weeds and long dry grass shall not be within 10 feet (3.1 meters) of any system.

Roof top storage.

Construction of the building/roof that carries the load of the storage tank must carry a minimum 1-hour fire rating.

System must be securely mounted to roof.

System must be located to allow for inspection of the system acceptable to the department based on the best interest of public health, safety, and welfare and the environment.

**3-2.3 Unloading connections on delivery equipment shall not be positioned closer to any of the exposures cited in table 3-2.2 than the distances given for the storage system.**

(a) H<sub>2</sub> transfer between cargo transport vehicle and stationary container systems (single or multiple containers utilizing a common or manifolded transfer line), shall comply with all of the following:

(i) Owners and operators shall ensure that fixed piping is used between the container and master shutoff and check valves. The piping and manifolds shall be secured to the container frame. Flexible hoses are only permitted between the check valve and the cargo vehicle unloading connection.

(ii) Emergency shutoff valves required in this section shall be tested annually for proper operation. The results of the tests shall be documented.

(iii) All installations shall have at least 1 clearly identified and easily accessible manually operated remote emergency shutoff device. Within 1 year after the effective date of these rules, existing installations shall have at least 1 clearly identified and easily accessible manually operated remote emergency shutoff device. The emergency shutoff device shall be located not less than 20 feet (6.1 meters) nor more than 100 feet (30.5 meters) in the path of egress from the emergency shutoff valve and not less than 20 feet (6.1 meters) from the container system.

(iv) During transfer of H<sub>2</sub> to and from cargo vehicles, the hand or emergency brake of the vehicle shall be set, and chock blocks shall be used to prevent rolling of the vehicle.

(v) Transfer systems shall be capable of depressurizing to facilitate disconnection. Bleed connections shall lead to a safe point of discharge.

(vi) Cargo vehicle shall be equipped with air-brake interlock in front of the unloading connection to protect against drive-away.

(b) The delivery vehicle shall be located so that all parts of the vehicle are on the premises when delivery is made. Check valves shall be located as close to the container as practical.

Sources of ignition shall not be permitted in the unloading area while transfer is in progress.

3-2.4 H<sub>2</sub> systems of less than 3500 scf (99 m<sup>3</sup>), where located inside buildings and exposed to other occupancies, shall be situated in the building so that the system will be as follows:

- (a) In an adequately ventilated area as in 4-2.2.
- (b) 20 feet (6.1 meters) from all classes of flammable and combustible liquids, oxidizing gases, and readily combustible materials, such as excelsior and paper.
- (c) 25 feet (7.6 meters) from open flames, ordinary electrical equipment, or other sources of ignition.
- (d) 50 feet (15.24 meters) from intakes of ventilation or air-conditioning equipment and air compressors.
- (e) 50 feet (15.24 meters) from other flammable gas storage.
- (f) Protected against damage or injury due to falling objects or working activity in the area.

**More than one system of 3500 scf (99 cubic meters) or less shall be permitted to be installed in the same room, provided the systems are separated by at least 50 feet (15.24 meters) or where a masonry structure having a minimum fire resistance rating of 2 hours is located between the systems. Each such system shall meet all of the requirements of this section.**

**Exception: The separation distance between multiple systems of 3500 scf (99 cubic meters) or less shall be permitted to be reduced to 25 feet (7.6 meters) in buildings where the occupancy between storage areas is free of combustible materials and protected with a sprinkler system designed for Ordinary Hazard, Group 1 occupancies or Light Hazard occupancies in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems.**

3-2.6 An owner and operator shall ensure that a container system, which is underground, mounded, or partially underground, is protected from corrosion by 1 of the following:

- (a) The approved container system is cathodically protected by all the following requirements:
  - (i) The approved container system is coated with a suitable dielectric material approved by the department.
  - (ii) Factory-installed or field installed cathodic protection systems are designed by a corrosion expert or in accordance with the NACE recommended practice RP0285 entitled “*Corrosion Control of Underground Storage Tank Systems by Cathodic Protection*,” or impressed current systems are designed to allow a determination of current operating status as required in section 5.4-1 of the H<sub>2</sub> code.
  - (iii) Cathodic protection systems are operated and maintained in accordance with the provisions of section 5.4-1 of the H<sub>2</sub> code.
- (b) The container is made of nonmetallic construction or corrosion-resistant, such as fiberglass or a composite.
- (c) Or other means acceptable to the department and based on the best interest of public health, safety, and welfare and the environment.

3-2.7 Out-of-service aboveground containers.

Containers that are no longer in service for a period of 12 months shall be closed. To close the aboveground container, the owner or operator shall empty the container, purge it with an inert gas and safeguard it against tampering. Piping that is removed from service shall be purged with nitrogen and capped or removed.

3-2.7.2 Each container that is to be reused at the original location or a new location shall be purged with an inert gas and be in compliance with all the requirements for the installation of a new container, and shall be recertified by the manufacturer or authorized representative, and tested in accordance with the container's design specifications or be pressure tested with an inert gas or H<sub>2</sub> at 1.1 times the maximum working pressure for not less than 10 minutes. Piping that is to be reused shall comply with all the

requirements for the installation of new piping and shall be tested in compliance with section 3-2.9 of this code prior to being brought back into service.

3-2.8 Out-of-service underground, mounded, and partially buried containers.

3-2.8.1 Containers that are no longer used to store  $H_2$  and are not intended to be brought back into service shall be permanently closed. To permanently close the container, the container shall be emptied and purged with an inert gas to render the container free of  $H_2$ , and then the container shall be removed from the ground. When a structure above or near the container prevents removal, the container shall be emptied and purged with an inert gas to render the container free of  $H_2$ , then the container shall be filled with an inert solid material. Piping that is permanently removed from service shall be purged with an inert gas and capped or removed.

3-2.8.2 Containers may be rendered temporarily out-of-service only when it is intended they be brought back into service at a later date. To temporarily close a container, all of the following requirements shall be met:

- (a) The container shall be emptied and purged with an inert gas.
- (b) Corrosion protection for the container and all underground piping shall be maintained in compliance with section 5-4.1 of this code.
- (c) The vent line shall remain functional.
- (d) The container shall be secured against tampering.
- (e) Piping that is temporarily removed from service shall be purged with an inert gas and capped.

3-2.8.2.1 Each container that is temporarily out of service for greater than 12 months shall be pressure tested with an inert gas at 1.1 times the maximum working pressure for not less than 10 minutes prior to being brought into service. Temporarily out of service piping shall be tested in compliance with section 3-2.9 of this code prior to being brought back into service.

3-2.9 Testing. After installation, prior to being placed into service, all container connections and all field-erected piping, tubing, hose, and hose assemblies shall be tested and proved  $H_2$  gas-tight for the rated pressure, volume, and temperature of the gas transported by an approved method as outlined in ASME B31.3, "*Chemical Plant and Petroleum Refinery Piping*," adopted by reference in section 8-1, or the following:

- (a) Perform a pressure test at 1.1 times maximum working pressure, 30 minutes per 500 cubic feet of pipe volume.
- (b) After pressure test, check for pressure decay. If leakage is detected, use leak detection fluid to find local leaks.

Energize the piping with  $H_2$  and check for local leaks with a "sonic tester," "sniffer," or method acceptable to the department based on the best interests of public health, safety, welfare and the environment.

If the test "fails" the requirements in subsections (a), (b), or (c) of this section, the system must be purged with an inert gas, repaired, and subsections (a), (b), and (c) of this section shall be repeated until the test "passes."

R 29.7035 Vaults for aboveground containers.

Rule 35. Sections 3-3 to 3-3.2 of the storage and handling of liquefied and gaseous  $H_2$  code are added as follows:

Vaults for aboveground containers.

3-3.1 General. Aboveground containers may be installed in vaults that meet the requirements of section 3-3. Except as modified by the provisions of section 3-3, vaults shall meet all other applicable provisions of these rules.

Vault design and construction. Vaults shall be designed and constructed to meet the following requirements:

The walls and floor of the vault shall be constructed of reinforced concrete at least 6 inches (15.24 centimeters) thick.

The top of an aboveground vault shall be constructed of noncombustible material and shall be designed to be weaker than the walls of the vault to ensure that, in the event of any explosion, the thrust occurring inside the vault is directed upward before destructive internal pressure develops within the vault. The top of an at-grade or below-grade vault shall be designed to relieve or contain the force of any explosion occurring inside the vault. The walls of a vault, which are partially below-grade, shall extend not less than 4 feet (1.2 meters) abovegrade.

The top and floor of a below-grade vault and the container foundation shall be designed to withstand all anticipated loading from vehicular traffic, where applicable.

The walls and floor of a below-grade vault shall be designed to withstand anticipated soil and hydrostatic loading. The vault shall be liquid tight.

Adjacent vault may share a common wall.

The vault enclosure shall not have openings except those necessary for access to, inspection of, and filling, emptying, and venting of the container.

When required, the vault shall be designed to be wind and earthquake resistant, in accordance with good engineering practice.

The vault shall be provided with an open and continuous vent to provide ventilation to dilute, disperse, and remove any vapors. This continuous vent line shall terminate 12 feet (3.7 meters) abovegrade.

Each vault shall be provided with a means for personal entry, which shall only be at the top of the vault to allow for the visual inspection of the container and piping surfaces. At each entry point, a warning sign that indicates the need for procedures for safe entry into a confined space shall be posted. Each entry point shall be secured against unauthorized entry and vandalism.

The vault shall be provided with an approved means to admit a fire suppression agent.

The loading and unloading transfer connection for abovegrade vaults shall terminate outside the vault.

Provisions shall be made for the normal operation of valves without entering the vault.

A vault shall be located not less than 15 feet (4.6 meters) from buildings and property lines.

Container selection and arrangement. Containers shall be listed for aboveground use. Each container shall be its own vault and shall be completely enclosed by the vault. Sufficient clearance between the container and the vault shall be provided to allow for visual inspection and maintenance of all the vault surfaces as well as the tank and its appurtenances.

The vault shall be provided with a continuous H<sub>2</sub> gas leak detection device with an audible alarm set at 25% of the LEL and will render the system inoperable. The H<sub>2</sub> leak detection device shall function during system maintenance operations.

R 29.7036 Location of dispensing operations and equipment.

Rule 36. Sections 3-4 to 3-4.5 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Location of dispensing operations and equipment.

Dispensing equipment located outdoors shall be in accordance with the following:

Dispensing equipment shall be allowed under weather protection in accordance with the requirements of section 4-5 and constructed in a manner that prevents the accumulation of H<sub>2</sub> gas.

Gaseous H<sub>2</sub> compression and storage equipment located on top of motor fuel-dispensing facility canopies shall be in accordance with the following:

(a) Canopies shall be constructed in accordance with the requirements for weather protection found in section 2209.3.2.6 of the International Fire Code.

(b) Fuel-dispensing areas under canopies shall be equipped throughout with an approved automatic sprinkler system. Operation of the fire sprinkler system shall activate the emergency functions of the following:

Operation of the fire sprinkler system shall activate an automatic emergency discharge system, which will discharge the H<sub>2</sub> gas from the equipment on the canopy top through the vent pipe system.

Operation of the fire sprinkler system shall activate the emergency shutdown control in section 7-6.

Approved signage having a minimum of 3-inch (7.62 centimeters) block letters shall be affixed on all sides on the exterior of the canopy structure stating either CANOPY TOP HYDROGEN STORAGE or using NFPA 704, “*Standard System for the Identification of Fire Hazards of Materials*,” 1996 edition, adopted by reference in section 8-1.1.

System must be in compliance with section 3-2.2.2.

Dispensing equipment located outdoors shall be aboveground, shall not be beneath electric power lines or where exposed by their failure, and shall be a minimum of 10 feet (3.1 meters) from the nearest important building or property line or 20 feet (6.1 meters) from any activity that involves a fixed source of ignition.

Dispensing equipment shall be located so that all parts of the vehicle being served are on the premises of the motor fuel dispensing facility.

Dispensing equipment shall be protected against collision damage by means acceptable to the department. Dispensing equipment shall be securely bolted in place. Dispensing equipment shall be installed in accordance with manufacturer’s instructions.

R 29.7037 Installation of emergency shutdown equipment.

Rule 37. Sections 3-5 to 3-5.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Installation of emergency shutdown equipment.

Breakaway protection shall be provided in a manner such that, if a pull away event occurs, H<sub>2</sub> gas will cease to flow at any separation.

A breakaway device shall be installed at every dispensing point. Such a device shall be arranged to separate by a force not greater than 150 pounds (75 kilograms), when applied in any direction that the vehicle would move. Breakaway devices shall be compatible with a standard acceptable to the department.

#### **Chapter 4 Design considerations at specific locations**

R 29.7038 Outdoor locations.

Rule 38. Sections 4-1, 4-1.1, and 4-1.2 were reproduced from NFPA 50A as follows:

##### **4-1 Outdoor Locations.**

**4-1.1 Where protective walls or roofs are provided, they shall be constructed of noncombustible or limited-combustible materials.**

**4-1.2 Electrical equipment within 15 feet (4.6 m) shall be in accordance with Article 501 of NFPA 70, *National Electrical Code*®, for Class I, Division 2 locations.**

R 29.7039 Separate buildings.

Rule 39. Sections 4-2.1, 4-2.4 to 4-2.6 are reproduced from NFPA 50A, and sections 4-2.2, and 4-2.3 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

**4-2 Separate buildings.**

**4-2.1 Separate buildings shall be constructed of noncombustible or limited-combustible materials. Windows and doors shall be located so as to be readily accessible in case of emergency.**

*Exception: Window glazing shall be permitted to be plastic.*

**4-2.2 Ventilation to the outdoors shall be provided. Inlet openings shall be located within 18 inches (30 centimeters) of the floor in exterior walls only. Outlet openings shall be located at the high point of the room in exterior walls or roof. Inlet and outlet openings shall each have a minimum total area of 1 square foot/1,000 cubic feet (1 square meters/305 cubic meters) of room volume. Discharge from outlet openings shall be directed or conducted to the atmosphere.**

**4-2.3 Deflagration venting shall be provided in exterior walls or roof only.**

**4-2.3.1 Vents shall be any 1 or any combination of the following:**

- (a) Walls of light material.
- (b) Lightly fastened hatch covers.
- (c) Lightly fastened, outward opening doors in exterior walls.
- (d) Lightly fastened walls or roof.
- (e) Other methods in accordance with NFPA 69.

**4-2.3.2 Where applicable, snow loads shall be considered.**

**4-2.4 There shall be no sources of ignition from open flames, electrical equipment, or heating equipment.**

**4-2.5 Electrical equipment shall be in accordance with Article 501 of NFPA 70, *National Electrical Code*, for Class I, Division 2 locations.**

**4-2.6 Heating, if provided, shall be by steam, hot water, or other indirect means except that electrical heating may be used if in compliance with 4-2.5.**

R 29.7040 Special rooms.

Rule 40. Sections 4-3.2 to 4-3.6 are reproduced from NFPA 50A, and sections 4-3.1, 4-3.7 to 4-3.9, and table 4-3.9 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

**4-3 Special rooms.**

**4-3.1 Floor, walls, and ceiling shall be constructed of noncombustible or limited-combustible materials. Interior walls or partitions shall have a fire resistance rating of at least 2 hours, shall be continuous from floor to ceiling, and shall be securely anchored. At least 1 wall shall be an exterior wall. Windows and doors shall be located so as to be readily accessible in case of emergency.**

*Exception: Window glazing may be of plastic.*

**4-3.1.1 If access to the room from outside the primary structure is not possible, access from within the primary structure shall be made through 1 vapor-sealing 2-hour self-closing fire door.**

**4-3.2 Ventilation shall be as provided in section 4-2.2.**

**4-3.3 Explosion venting shall be as provided in section 4-2.3.**

**4-3.4 There shall be no sources of ignition from open flames, electrical equipment, or heating equipment.**

**4-3.5 Electrical equipment shall be in accordance with Article 501 of NFPA 70, *National Electrical Code*, for Class I, Division 2 locations.**

**4-3.6 Heating, if provided, shall be by steam, hot water, or indirect means except that electrical heating shall be permitted to be used if in compliance with 4-3.5.**

**4-3.7 Room ventilation.**

4-3.7.1 The ventilation shall be at least 1 cubic feet/minute/square feet (0.3 cubic meters/minute/square meters) of room area, but not less than 1 cubic foot/minute/12 cubic feet (0.3 cubic meters/minute/3.7 cubic meters) of room volume and shall be designed such that an accumulation of  $H_2$  at a concentration equal to or greater than 25% of the lower flammability limit shall not occur in any part of the room.

Where installed, a gas detection system shall be equipped to sound an alarm and visually indicate when a maximum of 25% of the lower flammable limit is reached.

4-3.7.3 Any failure of the ventilation system shall immediately shut down the fueling system and provide notification to the system operator. Reactivation of the fueling system shall be by manual restart and shall be conducted by trained personnel.

4-3.7.4 The gas detection system shall function during ventilation system maintenance operations.

4-3.7.5 A ventilation system for a room within or attached to another building shall be designed to ensure that all areas serviced by the ventilation system meet performance requirements in accordance with section 4-3.7 during the normal operating conditions and during alarm conditions.

4-3.8 Warning signs.

4-3.8.1 Access doors shall have warning signs with the words “WARNING – NO SMOKING – NON ODORIZED FLAMMABLE GAS – NO OPEN FLAMES. The wording shall be in plainly legible, bright red letters not less than 1 inch (2.54 centimeters) high on a white background.

Indoor attended fast-fill fueling.

4-3.9.1 Attended indoor fast-fill fueling system shall be in accordance with subsections (a) to (l) of this section.

(a) Gas storage equipment shall be located outdoors unless approved by the department. Gas processing and compression equipment shall be listed or approved for indoor use or located outdoors.

(b) An emergency manual shutdown device shall be located in the dispensing area not less than 20 feet (6.1 meters) and not more than 100 feet (30.5 meters) in the path of egress from the dispensing area. Actuation of the emergency manual shutdown device shall perform in accordance with subsection (i) of this section.

(c) The dispenser shall be equipped with a gas detection system which shall actuate in accordance with subsection (i) of this section when a maximum of 25% of LFL is detected (1%  $H_2$  in air).

(d) The dispenser shall be equipped with a leak detection system capable of identifying a leak from the dispensing system outside the dispenser housing by conducting a pre-fill pressure test. The leak detection must be capable of detecting a minimum leak rate of 1.9 gallons/minute and shall actuate in accordance with subsection (i) of this section when a leak is detected.

(e) The dispenser communication system shall monitor fuel tank temperature and shall actuate in accordance with subsection (i) of this section when the temperature exceeds the design temperature of the onboard fuel storage system. In the event that the fill is non-communicated, the owner/operator must demonstrate that non-communicated fills are protective of the temperature limits of the on-board fuel system during fueling.

(f) The dispenser communication system shall monitor dispensed fuel pressure and shall actuate in accordance with subsection (i) of this section when pressure exceeds anticipated fuel pressure for the onboard fuel storage system. In the event that the fill is non-communicated, the owner/operator must demonstrate that non-communicated fills are protective of the pressure limits of the on-board fuel system during fueling.

(g) The dispensing area shall be equipped with a fire detection system and shall actuate in accordance with subsection (i) of this section if a fire is detected.

(h) A ventilation system shall be installed for the dispensing area. The ventilation system shall be capable of delivering ventilation air as provided in section 4.3.7. The ventilation system shall operate

prior to dispenser operation, during fueling, and for at least 1 minute after fueling has been completed. The ventilation flow rate shall be monitored. Failure or reduction of the ventilation flow rate below the required flow rate shall shut down the dispensing system.

*Exception: For communication fills, dispensing area ventilation system is not required for fuel delivery per refueling event if less than those listed in table 4-3.9.*

Table 4-3.9

Room Size (m3)	Maximum fuel delivery per refueling event that does not require room ventilation (kg)
1000	0.8
2000	1.7
3000	2.5
4000	3.3
5000	4.2

(i) The actuation of any 1 of the systems listed in subsections (b) to (h) of this section shall be in accordance with table 4-3.9, and shall shut down the dispenser, stop the flow of gas into the room, and start or continue to run the ventilation system, if required.

1. Reactivation of the dispenser and gas flow into the room shall be by manual restart and shall be conducted by trained personnel.

(j) Interior walls, doors, and window openings within 15 feet (4.6 meters) of the dispenser shall be constructed of materials having a fire rating of at least 2 hours. Wall penetrations shall require use of listed fire rated equipment.

(k) The owner/operator shall not allow hot work/open flames within 15 feet (4.6 meters) of the refueling location unless the dispenser is shut down, depressurized, and purged.

(l) If H<sub>2</sub> is to be removed from the vehicle storage system, H<sub>2</sub> shall be discharged into a closed transfer system or vented outdoors in accordance with CGA G-5.5, "Hydrogen Vent Systems", adopted by reference in section 8-1.

R 29.7041 Indoor H<sub>2</sub> system location.

Rule 41. Sections 4-4 to 4-4.6, and table 4-4.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Indoor H<sub>2</sub> system location.

H<sub>2</sub> systems of less than 3,500 scf (99 cubic meters) and greater than the maximum allowable quantity found in table 4.4.1, where located inside buildings outside of special rooms, shall be located in the building so that the system will be as follows:

In a ventilated area in accordance with the provisions of section 4-3.7.

Separated from incompatible materials.

15 feet (4.6 meters) from ordinary electrical equipment, and 25 feet (7.6 meters) from open flames or welding or other sources of ignition.

50 feet (15.2 meters) from other low-pressure flammable gas storage (less than 500 psig).

Protected against damage in accordance with the provisions of section 2.1.5.

Table 4-4.1

*Quantity Thresholds for Gases Requiring Special Provisions*

Material	Unsprinklered areas		Sprinklered areas	
	No gas cabinet, gas room, or exhausted enclosure	Gas cabinet, gas room, or exhausted enclosure	No gas cabinet, gas room, or exhausted enclosure	Gas cabinet, gas room, or exhausted enclosure
Cryogenic liquid (flammable or oxidizing)	45 gal	90 gal	90 gal	180 gal
Flammable gas liquefied nonliquefied	14 kg <sub>3</sub> (30 lb) 28 m <sup>3</sup> (1,000 ft <sup>3</sup> )	27 kg <sub>3</sub> (60 lb) 28 m <sup>3</sup> (2,000 ft <sup>3</sup> )	27 kg <sub>3</sub> (60 lb) 28 m <sup>3</sup> (2,000 ft <sup>3</sup> )	55 kg <sub>3</sub> (120 lb) 56 m <sup>3</sup> (4,000 ft <sup>3</sup> )

More than 1 system of 3,500 scf (99 cubic meters) or less shall be permitted to be installed in the same room or area outside of special rooms, provided the systems are separated by at least 50 feet (15.2 meters), or by a full height fire-resistive partition having a minimum fire resistance rating of 2 hours is located between the systems.

Each system described in section 4-4.2 shall meet all of the requirements of section 4-4.1.

The separation distance between multiple systems of 3,500 scf (99 cubic meters) or less shall be permitted to be reduced to 25 feet (7.6 meters) in buildings where the space between storage areas is free of combustible materials and protected with a sprinkler system.

When sprinkler protection is provided, the area in which H<sub>2</sub> is stored or used shall be protected with a sprinkler system designed to be not less than that required by NFPA 13, "*Standard for the Installation of Sprinkler Systems*," adopted by reference in section 8-1, for ordinary hazard group 2 with a minimum design area of 3,000 square feet (914.4 square meters).

When sprinkler protection is provided, the area in which the H<sub>2</sub> is stored or used shall be protected with a sprinkler system designed to be not less than that required by NFPA 13, "*Standard for the Installation of Sprinkler Systems*," adopted by reference in section 8-1, for extra hazard group 1 with a minimum design area of 2,500 square feet (762 square meters).

#### R 29.7042 Canopies.

Rule 42. Sections 4-5 to 4-5.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

#### 4-5 Canopies.

4-5.1 A container installation that has a canopy or roof shall have prior approval by the department based on the best interests of public health, safety, and welfare and the environment. This canopy or roof shall not limit the dissipation of heat or dispersion of flammable vapors and cannot restrict firefighting access and control.

4-5.2 A roof or canopy must meet all of the following conditions:

- The lowest elevation of the roof or canopy shall not be less than 4 feet (1.8 meters) from the top of the container.
- All container vent(s) are extended through the roof or canopy.
- The roof or canopy is constructed in such a way that it will not allow vapors to accumulate under the canopy or roof.
- Be constructed of noncombustible materials

R 29.7043 Fast-fill station.

Rule 43. Sections 4-6 to 4-6.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

4-6 Fast-fill station.

4-6.1 Each line between a gas storage facility and a dispenser at a fast-fill station shall have a valve that closes when 1 of the following occurs:

The power supply to the dispenser is cut off.

Any emergency shutdown device at the refueling station is activated.

4-6.2 A manual shutoff valve shall be provided at a fast-fill station upstream of the breakaway device specified in section 3-5, where it is readily accessible to the person dispensing H<sub>2</sub>, unless either of the following occurs:

(a) The self-closing valve referred to in section 4-6.1 is located immediately upstream of the dispenser.

(b) The dispenser is equipped with a self-closing valve that closes each time the control arm is turned to the off position or when an emergency device is activated.

R 29.7044 Vehicle fueling appliances in nonresidential occupancies.

Rule 44. Sections 4-7 to 4-7.7 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

4-7 Vehicle fueling appliances (VFA) in nonresidential occupancies.

VFAs shall not exceed a gas flow of 36 scf/minute.

VFAs shall be listed.

4-7.3 VFAs may be used to fill stationary containers at vehicular fueling locations.

A VFAs installed with storage containers shall comply with the provisions of chapters 2, 3, and 4.

The installation of VFAs at a residence shall comply with the requirements of section 4-9.

Where more than 1 VFA are located in a common area, spacing between the VFAs shall not be less than 3 feet (1 meter), unless permitted in the manufacturer's recommendations.

Unless specifically permitted in the manufacture's recommendations, multiple VFAs shall not be manifolded together on the discharge side.

R 29.7045 Installation of electrical equipment.

Rule 45. Sections 4-8 to 4-8.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Installation of electrical equipment.

Electrical equipment and wiring shall be specified and installed in accordance with NFPA 70, "*National Electrical Code*," adopted by reference in section 8-1.

Static protection shall be required when gaseous H<sub>2</sub> cargo transport vehicles are loaded or unloaded. This can be achieved when cargo transport vehicles or marine equipment are loaded or unloaded by conductive hose, flexible metallic tubing, or pipe connections where both halves of metallic couplings are in contact.

R 29.7046 Residential fueling facility.

Rule 46. Sections 4-9 to 4-9.11 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Residential fueling facility (RFF).

Application. This section applies to the design, construction, installation, and operation of an RFF.

Storage of H<sub>2</sub> in quantities not exceeding 3,500 scf (99 cubic meters) at 12,500 psig shall be permitted in systems listed by a national recognized testing laboratory.

4-9.2.1 The RFF may store H<sub>2</sub> indoors or outdoors. Indoor storage of H<sub>2</sub> shall not exceed 3,500 scf (99 cubic meters) at 7,700 psig provided that indoor storage is ventilated per section 4-3.7, or storage shall be in a separate sealed enclosure ventilated directly to outdoors.

System component qualifications. System components not part of a listed fueling appliance shall comply with the appropriate provisions of chapter 2.

Fueling appliances shall be listed.

General safety requirements. All equipment related to RFF installation shall be protected to minimize the possibilities of physical damage and vandalism. The use of an enclosure for the compressor package, similar to that of a central air conditioner, shall be permitted to satisfy this requirement.

All equipment related to RFF installation shall be designed for the pressure, temperature, and service expected.

Vehicles shall not be considered a source of ignition.

*Exception: Vehicles containing fuel-fired equipment, such as recreational vehicles, shall be considered a source of ignition unless this equipment is shut off completely before entering an area in which ignition sources shall not be permitted.*

Unless specifically permitted in the manufacturer's recommendations, multiple RFFs shall not be manifolded together on the discharge side.

Where more than 1 RFF is located in a common area, spacing between the RFFs shall not be less than 3 feet (1 meter) unless permitted by the manufacturer's recommendations.

Installation.

General. All RFF equipment shall include manufacturer's recommendations and such recommendations shall include, but may not be limited to, the requirements for the proper installation, operation, and maintenance of the RFF. The RFF shall be installed, operated, and maintained in accordance with the manufacturer's recommendations.

The RFF shall have a nameplate marked with minimum and maximum gas inlet pressure and flow rate, gas outlet maximum pressure, and electrical requirements.

Indoors. Where it is necessary to install the compression unit and refueling connections indoors, the compression unit shall be mounted or otherwise located such that the compression unit is vented outdoors.

Where the RFF or the vehicle being fueled is located indoors, a gas detector set to operate at 1/5 the lower limit of flammability of H<sub>2</sub> shall be installed in the room.

The detector shall be located within 6 inches (15.2 centimeters) of the ceiling or the highest point in the room.

The detector shall stop the flow of H<sub>2</sub> and operate an audible or a visual alarm.

Installation of pressure relief valves shall have pressure relief device vents or vent lines to convey escaping gas to the outdoors and then upward to a safe area to prevent impinging on buildings, other equipment, or areas open to the public, such as sidewalks.

4-9.7 Piping and hose. A fueling hose shall be limited to a maximum length of 25 feet (7.62 meters) and shall be protected from mechanical damage from abrasion and from being driven over by a vehicle.

4-9.7.1 Transfer systems shall be capable of depressurizing the nozzle to facilitate disconnection. Bleed connections shall lead to a safe point of discharge.

Testing. All piping and tubing shall be tested after assembly according to section 2-6.

Installation of emergency shutdown equipment. An RFF shall be equipped with emergency manual shut down of the fuel supply prior to the RFF device. The emergency manual shutdown actuator shall be at least 5 feet (1.52 meters) from the RFF and in view of the RFF.

Breakaway protection shall be provided in a manner so that, in the event of a pull away, H<sub>2</sub> ceases to flow.

The breakaway devices shall comply with ANSI/CSA HGV 4.4, “*breakaway devices for dispensing systems*,” adopted by reference in section 8-1.

A breakaway device shall be installed at every dispensing point.

The breakaway device in 4-9.8.2.3 shall be arranged to separate using a force not greater than 150 pounds (75 kilograms) when applied in a horizontal direction.

Operation. An RFF shall be operated in accordance with the manufacturer’s instructions.

A fuel supply container shall not be charged in excess of its maximum allowable service pressure at normal temperature.

U.S. DOT containers shall be charged in accordance with U.S. DOT regulations.

Where H<sub>2</sub> is being transferred to a motor vehicle, the engine shall be turned off.

Maintenance and inspection. All RFF equipment shall be inspected and maintained in accordance with the manufacturer’s instructions.

## **Chapter 5 Operation and maintenance**

### **R 29.7047 Operation.**

Rule 47. Section 5-1 is reproduced from NFPA 50A, and sections 5-1.1 to 5-1.3 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

**5-1 Operation. For installations that require any operation of equipment by the user, instructions shall be maintained at operating locations.**

A vehicle container shall not be charged in excess of the service pressure compensated for the differences in temperature from nominal.

5-1.2 H<sub>2</sub> vehicle containers shall not be subjected to pressure in excess of 125% of the marked service pressure even if, on cooling, the pressure settles to the marked service pressure.

Where an overpressure incident that results in operation of the overpressure protection system of the dispenser occurs, the dispenser pressure control system shall be examined and certified by a qualified operator prior to being returned to service.

### **R 29.7048 Maintenance.**

Rule 48. Section 5-2 is reproduced from NFPA 50A, and sections 5-2.1 to 5-2.11 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

**5-2 Maintenance. Each hydrogen system installed on consumer premises shall be inspected annually and maintained by a qualified representative of the equipment owner.**

5-2.1 Hoses, nozzles and breakaways shall be examined visually to ensure that they are safe for use and shall be maintained in accordance with manufacturer’s instructions on at least a quarterly basis or earlier if required by the manufacturer

Hose shall be tested for leaks per manufacturer’s requirements and any leakage shall be a reason for rejection and replacement.

Testing shall be carried out with helium or with helium/ H<sub>2</sub> blend as the test gas or if this is not possible, with H<sub>2</sub> using suitable precautions.

The facility operator shall maintain a maintenance log in good condition and accessible to department inspection. Records shall be maintained for a minimum of 2 years.

5-2.5 Controllers on fuel stations shall be designed to verify the integrity of the fuel hose, breakaway, nozzle, and receptacle by pressurizing these components to at least the vehicle backpressure and checking pressure drop prior to the start of fueling.

5-2.6 Containers and their appurtenances, piping systems, compression equipment, controls, and detection devices shall be maintained in operating condition and according to manufacturer's instructions.

Pressure relief valves shall be maintained in operating condition.

Maintenance personnel shall be trained in leak detection procedures.

Area within 10 feet (3.1 meters) of dispenser shall be free from debris, weeds and other material that present a fire hazard.

Safety, gas detection, and fire protection equipment shall be tested or inspected at intervals not to exceed 6 months.

Maintenance activities on fire control equipment shall be scheduled so that a minimum of equipment is taken out of service at any 1 time and fire prevention safety is not compromised.

R 29.7049 Clearance to combustibles.

Rule 49. Section 5-3 of the storage and handling of liquefied and gaseous H<sub>2</sub> code is added as follows:

**5-3 Clearance to combustibles. The area within 10 feet (3.1 meters) of any H<sub>2</sub> container shall be kept free of dry vegetation and combustible material.**

R 29.7050 Cathodic protection maintenance.

Rule 50. Sections 5-4 and 5-4.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

5-4 Cathodic protection maintenance.

5-4.1(a) Owners and operators shall ensure that all metallic container systems that are underground, mounded, or partially underground are protected and maintained to minimize corrosion as cited in the NACE standard RP0169 entitled "*Recommended Practice, Control of External Corrosion of Underground or Submerged Metallic Piping Systems*" and NACE recommended practice RP0285 entitled "*Corrosion Control of Underground Storage Tank Systems by Cathodic Protection*."

(b) All corrosion protection systems shall be operated and maintained to continuously provide corrosion protection to the metal components of the portion of the ASME approved container system that routinely contains H<sub>2</sub> gas and that is in contact with the ground.

(c) All container systems equipped with cathodic protection systems shall be inspected for proper operation by a NACE certified cathodic protection tester as defined in section 1-5. The H<sub>2</sub> system shall be tested within 6 months of installation and at least once each calendar year at intervals not to exceed 15 months.

(d) Container systems equipped with impressed current cathodic protection systems shall be inspected by the owner every 60 days to ensure that the equipment is operating within design specifications. The design limits shall be readily available.

(e) If container systems are equipped with cathodic protection, then the owner or operator shall maintain records to demonstrate that the cathodic protection is in compliance with the performance standards of this section. The records shall provide both of the following:

(1) The results of the last 3 inspections required in subsection (d) of this section.

The results of testing from the last 2 inspections required in subsection (c) of this section.

(f) Within 6 months following the repair of any cathodically protected container system, where the repairs may affect the operation of the cathodic protection system, the system shall be tested in accordance with subsections (c) and (d) of this section to ensure that it is operating properly.

(g) Repairs or replacement of a cathodic protection system shall be conducted by a NACE certified corrosion expert as defined in section 1-5. General system maintenance of the cathodic protection system including, but not limited to, replacement of fuses, and splicing of cable would not be required to be designed by a corrosion expert and shall be approved by the department to not increase the hazard to public health, safety, and welfare and the environment.

R 29.7051 Stray or impressed currents and bonding.

Rule 51. Sections 5-5 to 5-5.3 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Stray or impressed currents and bonding.

Where stray or impressed currents are used or can be present on dispensing systems, such as cathodic protection, protective measures to prevent ignition shall be taken.

Static protection between the fuel dispenser and the vehicle shall not be required where H<sub>2</sub> is transferred by conductive hose, flexible metallic tubing, or pipe connections where both halves of the metallic couplings are in continuous contact.

The transfer surface shall be concrete or shall have a resistivity not exceeding API-RP 2003, "*protection against ignitions arising out of static, lightning, and stray currents*," adopted by reference in section 8-1, performance criteria of 1 megohm as measured using a method acceptable to the department, such as EN 1081 1998 "*Resilient Floor Coverings – Determination of the Electrical Resistance*," adopted by reference in section 8-1.

R 29.7052 Emergency plan.

Rule 52. Sections 5-6 to 5-6.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Emergency plan.

An emergency plan shall be prepared and updated wherever gaseous or liquefied H<sub>2</sub> are produced, handled, stored, or used.

The plan shall be available to the department for inspection upon reasonable notice and shall include the following information:

The type of emergency equipment available and its location.

A brief description of any testing or maintenance programs for the available emergency equipment.

An indication that hazard identification labeling is provided for each storage area.

Location of posted emergency procedures.

A material safety data sheet (MSDS or equivalent) that is available for the gaseous or liquefied H<sub>2</sub> stored or used on the site.

A list of personnel or site operating authority who are designated and trained to be liaison personnel for the fire department and who are responsible for, but shall not be limited to, the following:

Aiding the emergency responders in pre-emergency planning.

Identifying the location of the gaseous and liquefied H<sub>2</sub> stored or used.

Accessing material safety data sheets.

Knowledge of the site emergency procedures.

(g) A list of types and quantities of gaseous and liquefied H<sub>2</sub> found within the facility.

R 29.7053 Release of H<sub>2</sub>.

Rule 53. Sections 5-7 to 5-7.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Release of H<sub>2</sub>.

Records of unexpected discharges. Accurate records of the unexpected discharge of gaseous or liquefied H<sub>2</sub> shall be kept by the facility and made readily available upon request. The records shall be kept for a minimum of 2 years.

Container failure. When an unexpected discharge due to container failure is discovered the department and the local fire department shall be immediately notified, and the container shall be repaired or be removed from service.

R 29.7054 Security.

Rule 54. Sections 5-8 and 5-8.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Security.

Compressed gas cylinders, containers, and systems shall be secured against accidental dislodgement and against access by unauthorized personnel.

R 29.7055 Leaks, damage, or corrosion.

Rule 55. Sections 5-9 and 5-9.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Leaks, damage, or corrosion.

Leaking, damaged, or corroded gaseous H<sub>2</sub> systems shall be removed from service, replaced, or repaired.

## **Chapter 6 Fire protection**

R 29.7056 Fire protection; caution.

Rule 56. Section 6-1 is reproduced from NFPA 50A as follows:

**6-1 Caution. Personnel shall be cautioned that hydrogen flames are practically invisible.**

R 29.7057 Signage.

Rule 57. Sections 6-2 to 6-2.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Hazard identification signs shall be conspicuously placed at all locations where H<sub>2</sub> gas is produced, stored, used, or handled.

6-2.1 Ratings shall be assigned in accordance with NFPA 704, standard system for the identification of the hazards of materials for emergency response.

6-2.2 The hazard classification of the metal hydride storage system shall be based on the H<sub>2</sub> stored without regard to the metal hydride content.

R 29.7058 Identification signs.

Rule 58. Sections 6-3 to 6-3.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

6-3 Signs prohibiting smoking or open flames within 25 feet (7.6 meters) shall be provided where H<sub>2</sub> gas is produced, stored, or used.

A sign with the following legends printed in red capital letters on a white background shall be conspicuously posted:

“NONODORIZED FLAMMABLE GAS - NO SMOKING – NO OPEN FLAMES”

All lettering on signage shall be 3 inches (7.62 centimeters) or more.

*Exception: This does not apply to motor vehicle dispensing per sections 7.2.16 and 4-3.8.1.*

6-3.2 Identification signs. Visible hazard identification signs shall be provided in accordance with NFPA 704, “*Standard System for the Identification of the Hazards of Materials for Emergency Response*,” adopted by reference in section 8-1, at entrances to buildings or areas in which liquefied H<sub>2</sub> is stored, handled, or used.

#### R 29.7059 Fire protection.

Rule 59. Section 6-4 of the storage and handling of liquefied and gaseous H<sub>2</sub> code is added as follows:

6-4 A portable fire extinguisher having a rating of not less than 40-B:C, or 2 20-B:C, shall be located within 75 feet (22.9 meters) from the pumps, dispensers, and container fill openings. Fire extinguishers shall be inspected and maintained according to NFPA 10, “*standard for portable fire extinguishers*,” adopted by reference in section 8-1.1.

#### R 29.7060 Sprinkler protection.

Rule 60. Section 6-5 of the storage and handling of liquefied and gaseous H<sub>2</sub> code is added as follows:

6-5 When sprinkler protection is provided, the area in which H<sub>2</sub> is stored or used shall be protected with an automatic sprinkler system designed to be not less than that required by NFPA 13, “*standard for the installation of sprinkler systems*,” adopted by reference in section 8-1.

### Chapter 7 Gaseous hydrogen compression, gas processing, storage, and dispensing systems

#### R 29.7061 System component qualifications.

Rule 61. Section 7-1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code is added as follows:

System component qualifications. System components shall comply with the appropriate provisions of chapters 2 and 3 of this part.

#### R 29.7062 General system requirements.

Rule 62. Sections 7-2 to 7-2.18 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

##### General system requirements.

All fuel dispensing facilities shall meet the provisions of this chapter.

7-2.2 Compression, processing, generation, storage, and dispensing equipment shall be protected to prevent damage from vehicles and minimize the possibilities of physical damage and vandalism and meet the requirements of section 2-1.5 and section 3-4.4.

7-2.2.1 Access to storage, compression, and gas processing equipment by members of the public shall be restricted by a suitable secure area.

7-2.3 Control devices shall be installed so that internal or external icing does not cause vehicle or fueling station malfunction.

7-2.4 Vehicles shall not be considered a source of ignition with respect to the provisions of this chapter.

*Exception: Vehicles containing fuel-fired equipment, such as recreational vehicles and catering trucks, shall be considered a source of ignition unless this equipment is shut off completely before entering an area in which ignition sources are not permitted.*

The fueling connection shall prevent the escape of gas where the connector is not properly engaged or becomes separated.

Fueling nozzles for H<sub>2</sub> service shall be in accordance with section 2-12.1.

Compression and gas processing equipment shall be designed for use with H<sub>2</sub> and for maximum pressures and temperatures to which it can be subjected under normal operating conditions.

Compression and gas processing equipment shall have pressure relief devices that limit each stage pressure to the maximum allowable working pressure for the compression cylinder and piping associated with that stage of compression and meets the requirements of chapter 2.

H<sub>2</sub> compression equipment shall be equipped with appropriate automatic shutdown controls.

Control circuits that shut down shall remain down until manually activated or reset by qualified personnel.

Engine-driven compressor installations shall conform where applicable to R 29.5101 et seq.

Gas processing equipment, including compression and generation equipment, in processes where liquid is present, shall incorporate means to minimize liquid carryover to the storage system.

A hazard analysis shall be conducted on every H<sub>2</sub> fueling system installation by a qualified engineer with proven expertise in H<sub>2</sub> fueling systems and installations.

*Exception: This does not apply to section 4-9.*

The hazard analysis shall include the following: fire protection measures, fire protection and suppression systems, detection systems, and ventilation.

At a minimum, the hazard analysis shall include consideration of potential failures in hoses, nozzles, dispensing equipment, as well as failures for maintenance and service.

Method used for hazard analysis shall be 1 or combination of several of the following recognized procedures: hazard and operability studies (HAZOPs), failure mode effects and criticality analysis (FMECA), preliminary hazards analysis (PHA), fault tree analysis (FTA) and event tree analysis (ETA). Other analysis methods, when used, shall ensure same level of system safety as provided by any of the recognized procedures and be acceptable to the department based on the best interest of the public health, safety, and welfare and the environment.

Standard designs that have been analyzed by recognized procedures need not be studied each and every time such installation occurs. Site-specific elements that are unique to the installation shall be reviewed in concert with the analysis performed on the standard system to ensure that the standard design has not been altered in a way that would negatively affect the hazard analysis.

These hazard analyses shall be available for review at final inspection, prior to the installation being placed into service, shall be maintained on site, and be available to the department upon request.

Dispensing systems shall be equipped to stop fuel flow automatically when a fuel supply container reaches the temperature-corrected fill pressure.

Dispensing systems shall be equipped with an overpressure protection device set at 140 percent of the service pressure of the fueling nozzle it supplies.

Warning signs shall be conspicuously posted in the dispensing area and shall incorporate the following or equivalent wording: “Stop Motor, No Smoking, Non-Odorized Flammable Gas. No Filling Of Portable Containers In Or On A Motor Vehicle.”

Each H<sub>2</sub> -dispensing device shall be located not less than 10 feet (3.1 meters) from property lines, openings to buildings, and buildings of combustible wall construction. A dispensing device shall not be

less than 20 feet (6.1 meters) from any activity that involves a fixed source of ignition. In addition, a dispenser shall not be placed beneath a power line.

Each container filling location that is open to the public shall have an attendant or supervisor on duty who meets the requirements of section 1-10.1 of the rules.

R 29.7063 Operating requirements for full-service H<sub>2</sub> motor fuel dispensing facilities.

Rule 63. Sections 7-3 to 7-3.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Operating requirements for full-service H<sub>2</sub> motor fuel dispensing facilities.

Each motor fuel dispensing facility shall have an attendant or supervisor on duty whenever the facility is open for business. The attendant or supervisor shall dispense H<sub>2</sub> into fuel tanks of motor vehicles or into portable containers.

The provisions of section 2-1 of this part shall not prohibit the temporary use of a portable storage container in conjunction with the dispensing of H<sub>2</sub> into a container or motor vehicle or motorized equipment which is on the premises and which is not accessible to the public. A portable storage container installation shall only be made with the approval of the department and comply with all the requirements of section 2-13.

R 29.7064 Operating requirements for attended self-service motor fuel dispensing facilities.

Rule 64. Sections 7-4 to 7-4.5 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Operating requirements for attended self-service motor fuel dispensing facilities.

Self-service motor fuel dispensing facility means that portion of a property where H<sub>2</sub> used as motor fuel is stored and dispensed from fixed, approved dispensing equipment into the fuel containers of motor vehicles by persons other than the facility attendant and shall also include, where provided, facilities for sale of other retail products.

There shall be at least 1 attendant on duty while the self-service facility is open for business. The attendant's primary function shall be to supervise, observe, and control the dispensing of H<sub>2</sub> while the H<sub>2</sub> is actually being dispensed.

The responsibility of the attendant shall be as follows:

(a) Prevent the dispensing of H<sub>2</sub> into portable containers in or on a motor vehicle.

(b) Control sources of ignition.

(c) Immediately activate emergency controls and notify the fire department of any fire.

The attendant or supervisor on duty shall be mentally and physically capable of performing the functions and assuming the responsibility prescribed in section 7-4.3.

Operating instructions shall be conspicuously posted in the dispensing area.

The dispensing area shall at all times be in clear view of the attendant, and the placing or allowing of any obstacle to come between the dispensing area and the attendant control area is prohibited. This may be achieved by cameras, mirrors, or both. The attendant shall at all times be able to communicate with persons in the dispensing area.

R 29.7065 Operating requirements for unattended self-service motor fuel dispensing facilities.

Rule 65. Sections 7-5 to 7-5.5 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Operating requirements for unattended self-service motor fuel dispensing facilities.

Unattended self-service shall be permitted subject to the approval of the department based on the best interests of public health, safety, and welfare and the environment. Users shall use a key, card, or other method which is unique to each user, and which is provided by the facility operator, and shall be properly trained in dispensing operations. The owner shall verify such training to the department upon request.

At least 1 emergency shutoff device specified in section 7-6 shall be provided, and shall be reset only by the owner or an owner's authorized agent.

Operating instructions shall be conspicuously posted in the dispensing area. The instructions shall include the location of emergency controls.

In addition to the warning signs specified in section 6-3, emergency instructions shall be conspicuously posted in the dispenser area. The instructions shall incorporate the following or equivalent wording:

“Emergency instructions

In case of fire:

(1) Use emergency stop button.

(2) Report accident by calling the local fire number. Report location.”

A telephone or other approved, clearly identified means to notify the fire department shall be provided on the site in a location approved by the department.

R 29.7066 Emergency shutoff devices.

Rule 66. Sections 7-6 to 7-6.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Emergency shutoff devices.

H<sub>2</sub> dispensing systems shall be provided with 1 or more clearly identified emergency shutoff devices or electrical disconnects at the dispensing area. Such devices or disconnects shall be installed in approved locations but not less than 10 feet (3.1 meters) and not more than 100 feet (30.5 meters) away from the dispensing area and which is along the means of egress. Emergency shutoff devices or electrical disconnects shall disconnect power and gas supply to all dispensing devices, to all remote pumps serving the dispensing devices, and to all associated power. When more than 1 emergency shutoff device or electrical disconnect is provided, all devices shall be interconnected. Resetting from an emergency shutoff shall require manual intervention and the manner of resetting shall be approved by the department.

R 29.7067 Refueling from transport vehicles.

Rule 67. Sections 7-7 to 7-7.11 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Refueling from transport vehicles. The dispensing of H<sub>2</sub> in the open from a transport vehicle to a motor vehicle located at commercial, industrial, governmental, or manufacturing establishments and intended for fueling vehicles used in connection with their businesses shall be permitted if all of the requirements of sections 7-7.1 to 7-7.11 have been met.

The department shall be notified before commencing operations under section 7-7.

The transport vehicle shall comply with U.S. DOT requirements for the transportation of H<sub>2</sub>.

Nighttime deliveries shall only be made in an area considered to be adequately lighted.

The transport vehicle flasher lights shall be in operation while dispensing operations are in progress.

Smoking materials, including matches, lighters, and other sources of ignition, including torches, shall not be used within 20 feet (6.1 meters) of the dispensing of H<sub>2</sub> in the open from a transport vehicle to a motor vehicle.

Each area where dispensing of H<sub>2</sub> in the open from a transport vehicle to a motor vehicle shall be provided with 1 or more listed fire extinguishers that have a minimum capability of 40-B:C. The fire extinguishers shall be readily accessible to the dispensing operation. Fire extinguishers shall be inspected and maintained under NFPA 10, “*Standard for Portable Fire Extinguishers*,” adopted by reference in section 8-1.

Mobile fueling shall take place aboveground, shall not be beneath electric power lines or where exposed by their failure, and shall be a minimum of 10 feet (3.1 meters) from the nearest important building, property line, or combustible storage.

Transport vehicle brakes shall be set and chock blocks shall be in place.

Persons performing dispensing operations shall be qualified to deliver and dispense H<sub>2</sub> fuels. Operations of transport vehicles used for mobile fueling operations shall have access on-site or be in possession of an emergency communications device to notify the proper authorities if there is an emergency.

The transport vehicles shall be positioned with respect to vehicles being fueled to prevent traffic from driving over the delivery hose and between the transport vehicle and motor vehicle being fueled. The dispensing hose shall be properly placed on an approved reel or in an approved compartment before moving the transport vehicle.

Additional requirements. The transfer area must meet the requirements of section 5-5.

#### Chapter 8 Referenced publications

##### R 29.7068 Referenced publications.

Rule 68. Sections 8-1 to 8-1.2.10 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

The following documents or portions thereof are referenced within this standard as mandatory requirements and shall be considered part of the requirements of this standard. The edition indicated for each referenced mandatory document is the current edition, and cost as of the date of issuance of these rules. Copies of the adopted publications are available for inspection at the office of the Department of Environmental Quality, Waste and Hazardous Materials Division, Storage Tank Unit, P.O. Box 30241, Lansing, Michigan 48909-7741.

NFPA publications. National Fire Protection Association. 1 Batterymarch Park, P.O. Box 9101, Quincy, Massachusetts 02269-9101.

NFPA 10, “*Standard for Portable Fire Extinguishers*,” 2002 edition, \$36.50.

NFPA 13, “*Standard for the Installation of Sprinkler Systems*,” 2002 edition, \$70.00.

NFPA 51, “*Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes*,” 2002 edition, \$28.00.

NFPA 55, “*Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks*,” 2005 edition, \$36.50.

NFPA 69, “*Standard on Explosion Prevention Systems*,” 2002 edition, \$33.50.

NFPA 70, “*National Electrical Code*,” 2005 edition, \$75.00.

NFPA 101, “*Life Safety Code*,” 2006 edition, \$75.00.

NFPA 220, “*Standard on Types of Building Construction*,” 1999 edition, \$28.00.

NFPA 496, “*Standard for Purged and Pressurized Enclosures for Electrical Equipment*,” 2003 edition, \$33.50.

NFPA 704, “*Standard System for the Identification of the Hazards of Materials for Emergency Response*,” 2001 edition, \$33.50.

Other publications.

ASME publications. American Society of Mechanical Engineers, Three Park Avenue, New York, New York 10016-5990.

ANSI/ASME B31.3, "*Process Piping*," 2002 edition, \$240.00.

ASME International, "*Boiler and Pressure Vessel Code, Section VIII*," 2004 edition, \$525.00.

ASTM publication. American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428-2959.

ASTM E136-04, "*Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C*," 2004 edition, \$35.00.

CGA publications. Compressed Gas Association, 1725 Jefferson Davis Highway, Arlington Virginia 22202-4100.

CGA S-1.1, "*Pressure Relief Device Standards – Part 1 – Cylinders for Compressed Gases*," 2002 edition, \$196.00.

CGA S-1.2, "*Pressure Relief Device Standards – Part 2 – Cargo and Portable Tanks for Compressed Gases*," 1995 edition, \$145.00.

CGA S-1.3, "*Pressure Relief Device Standards – Part 3 – Stationary Storage Containers for Compressed Gases*," 2003 edition, \$145.00.

ANSI/CGA C-4, "*Method of Marking Portable Compressed Gas Containers to Identify the Material Contained*," 2003 edition, \$252.00.

CGA C-7, "*Guide to the Preparation of Precautionary Labeling and Marking of Compressed Gas Containers*," 2000 edition, \$268.00.

CGA G-5.5, "*Hydrogen Vent Systems*," 2004 edition, \$39.00.

IAS publications. International Approval Services, 8501 East Pleasant Valley Road, Cleveland, Ohio 44131.

ANSI/IAS NGV 4.4, "*Breakaway Devices for Dispensing Systems*," 1999 edition, \$57.00.

NACE publications. National Association of Corrosion Engineers International, 1440 South Creek Drive, Houston, Texas 77084.

NACE RP0169, "*Control of External Corrosion of Underground or Submerged Metallic Piping Systems*," 2002 edition, \$42.00.

NACE RP0285, "*Corrosion Control of Underground Storage Tank Systems by Cathodic Protection*," 2002 edition, \$37.00.

SAE publications. Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, Pennsylvania 15096.

SAE J2600, "*Compressed Hydrogen Surface Vehicle Fueling Connection Devices*," 2002 edition, \$59.00.

8-1.2.7 International codes council. 4051 West Flossmore Road, Country Club Hills, Illinois 60478-5795.

"*International Fire Code*," 2006 edition, section 2209.3.2.6, \$61.50.

8-1.2.8 U.S. Government publications. U.S. Government Printing Office, Washington, DC 20402.

Title 49, Code of Federal Regulations, "*Transportation*," Parts 171-190, U.S. Department of Transportation "*Specifications and Regulations*."

ECS publications. European Committee for Standardization, Central Secretariat: rue de Stassart 36, B-1050, Brussels.

EN 1081, "*Resilient Floor Coverings, Determination of the Electrical Resistance*," 1998 edition, \$32.00.

API publications. American Petroleum Institute, 1220 L Street, Northwest, Washington, DC, 20005-5-4070.

API Recommended Practice 2003, “*Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents*,” 7<sup>th</sup> edition, \$111.00.

## PART 3. STORAGE AND HANDLING OF LIQUEFIED HYDROGEN 50B

### Chapter 1 General information

R 29.7070 Scope.

Rule 70. Sections 1-1 to 1-1.3 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

1-1 Scope.

1-1.1 Application. This standard covers the requirements for the design, siting, construction, installation, spill containment, operation, maintenance, and dispensing from a liquefied H<sub>2</sub> system.

1-1.2 Nothing in this H<sub>2</sub> code shall be intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, environmental protection capability, or safety over those prescribed by this H<sub>2</sub> code, if technical documentation is submitted to the department to demonstrate equivalency and the system, method, or device is approved for the intended purpose.

1-1.3 This code shall apply to the design and installation of liquefied H<sub>2</sub> dispensing systems.

*Exception: Dispensing into rail and aircraft.*

R 29.7071 Retroactivity.

Rule 71. Sections 1-2 and 1-2.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

1-2 Retroactivity.

1-2.1 The provisions of this H<sub>2</sub> code are necessary to provide a reasonable level of protection from loss of life and property from fire and explosion. The provisions shall reflect situations and the state of the art prevalent when the H<sub>2</sub> code was issued. Unless otherwise noted, it shall not be intended that the provisions of this H<sub>2</sub> code be applied to facilities, equipment, structures, or installations that were existing or approved for construction or installation before the effective date of this H<sub>2</sub> code, except in those cases where it is determined by the department that the existing situation involves a distinct hazard to public health, safety, and welfare, and the environment.

R 29.7072 Definitions.

Rule 72. Section 1-3 of the storage and handling of liquefied and gaseous H<sub>2</sub> code is added and section 1-3.1 is reproduced from NFPA 50B as follows:

1-3 Definitions.

“ANSI” means the american national standards institute.

“Approved” means acceptable to the department.

“ASME” means the american society of mechanical engineers.

“Authority having jurisdiction” means the department.

“Automatic emergency shutoff valve” means a designated fail-safe automatic closing valve designed to shut off the flow of gases or liquids that is initiated by a control system where the control system is activated by either manual or automatic means.

“Bulk storage” means a single container or containers, where all containers draw down at the same time.

“Cargo transport container” means a mobile unit designed to transport gaseous or liquefied H<sub>2</sub>.

“Cascade storage system” means storage in containers or cylinders arranged in banks where each bank acts as 1 large container. The banks are separated by switching valves to provide sequential drawdown of the banks. The bank may consist of 1 or more containers or cylinders.

“Cathodic protection” means a technique to prevent the corrosion of a metal surface by making the surface the cathode of an electrochemical cell. This protection renders a metallic container or piping component negatively charged with respect to its environment. This protection shall be designed by a corrosion expert as defined by these rules.

“Cathodic protection tester” means a person who can demonstrate an understanding of the principles and measurements of all common types of cathodic protection systems applicable to metal piping and container systems and who has education and experience in soil resistivity, stray current, structure-to-soil potential, and component electrical isolation measurements of metal piping and container systems. The person shall be certified as being qualified by the national association of corrosion engineers (NACE) international.

“Composite container” means a container fabricated of 2 or more materials that interact to facilitate the container design criteria.

“Compression discharge pressure” means the varying pressure at the point of discharge from the compressor.

“CGA” means the compressed gas association.

“Container” means a pressure vessel or cylinder used to store H<sub>2</sub>.

“Container appurtenances” means devices connected to container openings for safety, control, or operating purposes.

“Container system” means a container or combination of containers and all attached appurtenances, valves, and piping.

“Container valve” means a valve connected directly to the container outlet.

“Continuous gas detection system” means a gas detection system in which the instrument is maintained in continuous operation.

“Corrosion expert” means a person who, by reason of thorough knowledge of the physical sciences and the principals of engineering and mathematics acquired by a professional education and related practical experience, is qualified to engage in the practice of corrosion control of container systems. The person shall be certificated as being qualified by NACE, as a senior corrosion technologist, a cathodic protection specialist, or a corrosion specialist or be a registered engineer who has certification and licensing that includes education and experience in corrosion control.

“Corrosion protection” means protecting a container system to prevent the degradation of the metal through oxidation or reactivity with its environment.

“Cryogenic fluid” means a fluid with a boiling point lower than -130 degrees Fahrenheit (-90 degrees Celsius) at an absolute pressure of 101.325 kPa (14.7 psia).

“Cylinder” means a container constructed in accordance with the United States Department of Transportation specifications, Title 49, code of federal regulations (CFR), parts 171-190.

“Department” means the department of environmental quality.

“Director” means the director of the department of environmental quality.

“Dispensing station” means an H<sub>2</sub> installation that dispenses H<sub>2</sub> from storage containers into fuel supply containers or into portable cylinders by means of a compressor, reformer, vaporizer, or pressure booster.

“Emergency shutdown device (ESD)” means a device that closes all fueling operations within the fueling facility from either local or remote locations.

“Excess flow control” means to limit or stop the flow of H<sub>2</sub> gas from a source of supply, when there is a rupture, break, or ‘open valve to atmosphere’ condition that may present a hazard to personnel or the environment.

“Fail-safe” means a design feature that provides for the maintenance of safe operating conditions in the event of a malfunction of control devices or an interruption of an energy source.

“Fixed liquid level device” means a device that indicates when the container is filled to its maximum permitted liquid filling volume.

“Flow-through process container” means a container that forms an integral part of a production process through which there is a steady, variable, recurring, or intermittent flow of materials during the operation of the process and the container is utilized to carry out or control the heating, cooling, mixing, blending, separating, metering, or chemical reaction of materials. The processing is done on a regular basis and it is the primary function of the container. A flow-through process container does not include a container that is used for the storage of materials before its introduction into the production process or for the storage of finished products or by-products from the production process or a container that is only used to recirculate materials.

“Fuel dispenser system” means all the pumps, meters, piping, hose, and controls used for the delivery of fuel.

“Fueling connector” means a mating device at the refueling station, including shutoff valves that connect the fueling dispenser hose to the vehicle fuel filling system receptacle for the transfer of liquid or vapor.

“Gallon water capacity (wc)” means the amount of water in gallons at 60 degrees Fahrenheit (15.6 degrees Celsius) required to fill a container.

“Gas detection system” means a grouping of 1 or more sensors capable of detecting an H<sub>2</sub> leak at specified concentrations and activating alarms and safety systems.

“Gaseous H<sub>2</sub> system” means a system in which the H<sub>2</sub> is delivered, stored, and discharged in the gaseous form including the piping system. The gaseous H<sub>2</sub> system terminates at the point where the H<sub>2</sub> is dispensed.

“Hydrogen (H<sub>2</sub>)” means the simplest and lightest element in the known universe, which exists as a gas except at low cryogenic temperatures. H<sub>2</sub> gas is a colorless, odorless and highly flammable gas when mixed with oxygen over a wide range of concentrations. H<sub>2</sub> forms water when combusted, or when otherwise joined with oxygen, as within a fuel cell.

“Hydrogen code” means the storage and handling of gaseous and liquefied H<sub>2</sub> rules as promulgated by the department.

“Hydrogen gas vehicle (HGV) or vehicle” means a self-propelled device on land; in, on, or by which any person or property is or may be transported or drawn upon, except for a device exclusively moved by human power; and which has the capability to use H<sub>2</sub> gas as an engine fuel.

“Ignition source” means any item or substance capable of an energy release of type and magnitude sufficient to ignite any flammable mixture of gases or vapors that could occur at the site.

“kPa” means absolute pressure in kilo-Pascals.

“kPag” means gauge pressure in kilo-Pascals.

“Labeled” means equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the department and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with accepted or approved standards of construction and or performance.

“Liquefied hydrogen system” means a system into which liquefied H<sub>2</sub> is delivered and stored and from which it is discharged in the liquid or gaseous form including the piping system. The liquid or gaseous H<sub>2</sub> system terminates at the point where the H<sub>2</sub> is dispensed.

“Listed” means equipment, materials, or services included in a list published by an organization that is acceptable to the department and concerned with evaluation of products or services, that maintains periodic inspection of production listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

“Manifolded storage system” means storage in containers arranged in banks where each bank acts as 1 large container. The banks are separated by switching valves to provide sequential drawdown of the banks. The bank may consist of 1 or more containers.

“Manual emergency shutoff valve” means a designated valve designed to shut off flow due to a rupture in pressurized piping system.

“Maximum allowable working pressure (MAWP)” means the maximum pressure to which any component or portion of the pressure system can be subjected.

“Maximum operating pressure” means the steady-state gauge pressure at which a part or system normally operates.

“Metal hydride storage system” means a system for the storage of H<sub>2</sub> gas absorbed in solid material.

“Motor fuel dispensing facility” means that portion of the property where H<sub>2</sub> is stored and dispensed from fixed equipment into the fuel tanks of motor vehicles or marine craft or into approved containers, including all equipment used in connection therewith.

“NACE” means the national association of corrosion engineers, international.

“Original equipment manufacturer (OEM)” means an original equipment motor vehicle manufacturer that certifies that the motor vehicle complies with applicable federal motor vehicle safety codes.

“Partially buried container” means a container that has part of, but less than 100%, of the container surface covered with earth.

“Point of transfer” means the point where the transfer connection is made.

“Portable container” means a container designed to be moved readily, as distinguished from containers designed for stationary installations. Portable containers, designed for transportation with H<sub>2</sub> filled to their maximum filling limit, include "cylinders," "cargo tanks," and "portable tanks," all 3 of which are defined separately. Containers designed to be readily moved from 1 usage location to another, but substantially empty of product, are "portable storage containers" and are defined separately.

“Portable storage container” means a container similar to those designed and constructed for stationary installation, designed so that it can be moved readily over the highways, substantially empty of liquefied H<sub>2</sub>, from 1 usage location to another. Such containers either have legs or other supports attached, or are mounted on running gear, such as trailer or semitrailer chassis, with suitable supports that can be of the fold-down type, allowing them to be placed or parked in a stable position on a reasonably firm and level surface. For large-volume, limited-duration product usage, such as at construction sites and normally for 6 months or less, portable storage containers function in lieu of permanently installed stationary containers.

“Portable tank, or skid tank” means a container of more than 1,000 pounds (454 kilograms) water capacity used to transport H<sub>2</sub> handled as a package, that is, filled to its maximum permitted filling limit. Such containers are mounted on skids or runners and have all container appurtenances protected in such a manner that they can be safely handled as a package.

“Pressure relief device” means a pressure or temperature activated device used to prevent pressure from rising above a specified value and thereby prevent the rupture of a normally charged pressure vessel or a cylinder due to emergency or abnormal conditions.

“Pressure vessel” means a container or other component designed in accordance with the ASME code.

“psi” means pounds per square inch.

“psia” means pounds per square inch, absolute.

“psig” means pounds per square inch gauge.

“Rated pressure” means the pressure to which a component is rated provided that the MAWP is observed for temperature extremes.

“Release” means an unexpected discharge of H<sub>2</sub>.

“Remotely located manually activated shutdown control” means a control system that is designed to initiate shut down of the flow of gas or liquid that is manually activated from a point located some distance from the delivery system.

“Service pressure” means the nominal gas pressure at a uniform gas temperature of 70 degrees Fahrenheit (15.6 degrees Celsius) when the equipment is properly and completely charged with gas; the nominal design pressure for which the equipment has been constructed.

“Set pressure” means the start-to-discharge pressure for which a relief valve is set and marked.

“Standard cubic foot (scf)” means 1 cubic foot of gas at 70 degrees Fahrenheit (21 degrees Celsius) and 14.7 psia (101 kPa).

“Standard cubic foot per minute (scfm)” means the amount of airflow per volume in standard cubic feet per minute compensated for pressure and temperature.

“Substantially empty” means a gas container of H<sub>2</sub> when the residual gas pressure is less than 10% of the maximum allowable working pressure of the vessel. A liquefied H<sub>2</sub> container is substantially empty when the liquid level within the container is less than 10% of its normal operating volume.

“Vaporizer” means a device other than a container that receives H<sub>2</sub> in liquid form and adds sufficient heat to convert the liquid to a gaseous state.

“Vehicle-fueling appliance” means a self-contained listed assembly used for the compression and delivery of H<sub>2</sub> into vehicles including associated equipment and piping of the appliance.

1-3.1 NFPA official definitions.

Combustible liquid. A liquid having a closed-cup flash point at or above 100°F (37.8°C) and are subdivided as follows:

(a) Class II liquids include those having a flash point at or above 100°F (37.8°C) and below 140°F (60°C).

(b) Class IIIA liquids include those having a flash point at or above 140°F (60°C) and below 200°F (93.4°C).

(c) Class IIIB liquids include those having a flash point at or above 200°F (93.4°C).

Flammable liquid (Class I). Any liquid having a closed-cup flash point below 100°F (37.8°C) and having a vapor pressure not exceeding 40 psia (276 kPa) at 100°F (37.8°C).

Gallon. A standard U.S. gallon.

Limited-Combustible Material. A material, as defined in NFPA 220, *Standard on Types of Building Construction*, not complying with the definition of noncombustible material that, in the form in which it is used, has a potential heat value not exceeding 3500 Btu/lb (8141 kJ/kg) and complies with one of the following paragraphs (a) or (b). Materials subject to an increase in combustibility or flame spread rating, beyond the limits herein established, through the effects of age, moisture, or other atmospheric condition are considered combustible.

(a) Materials having a structural base of noncombustible material, with a surfacing not exceeding a thickness of  $\frac{1}{8}$  in. (3.2 mm) that has a flame spread rating not greater than 50.

(b) Materials, in the form and thickness used, other than as described in (a), having neither a flame spread rating greater than 25 nor evidence of continued progressive combustion and of such composition that surfaces that would be exposed by cutting through the material on any plane would have neither a flame spread rating greater than 25 nor evidence of continued progressive combustion.

**Noncombustible material.** A material, as defined in NFPA 220, *Standard on Types of Building Construction*, that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat. Materials reported as noncombustible, when tested in accordance with ASTM E 136, *Standard Method of Test for Behavior of Materials in a Vertical Tube Furnace at 750°C*, are considered noncombustible materials.

**Outdoors.** Location outside of any building or structure or locations under a roof, weather shelter, or canopy provided this area is not enclosed on more than two sides.

**Separate building.** A detached, noncommunicating building used exclusively to house a hydrogen system.

**Shall.** Indicates a mandatory requirement.

**Special room.** A separate enclosed area that is part of or attached to another building and is used exclusively for a hydrogen system.

**Standard.** A document, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions shall be located in an appendix, footnote, or fine-print note and are not to be considered a part of the requirements of a standard.

#### R 29.7073 Prohibitions.

Rule 73. Sections 1-4 to 1-4.4 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

##### Prohibitions.

Any liquefied H<sub>2</sub> storage container system or practice that is not in compliance with these rules shall be considered to be in violation of these rules.

Upon notification by the department, a person shall not deliver liquefied H<sub>2</sub> to a storage container system under any circumstances that are prohibited by these rules or if a container is not in compliance with these rules. Such notification may include a verbal or written communication or an affixed written notification on the H<sub>2</sub> system.

A person shall not tamper with, remove, or disregard written notification affixed to the storage container system.

An owner or operator shall not continue to use a storage container system that is causing a release and shall expeditiously empty the system or the component that is causing the release until the system is repaired or replaced.

#### R 29.7074 Installation application.

Rule 74. Sections 1-5 to 1-5.4 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

##### 1-5 Installation application.

1-5.1 An application for plan review shall be submitted, on a form provided by the department, by the owner or owner's designee on behalf of the owner to the department not less than 30 days before the installation of an H<sub>2</sub> storage container system.

1-5.1.1 The installation application shall include all of the following information:

(a) A plot map showing all of the following within 100 feet (30.5 meters) of any portion from the container system:

(i) The location of the following:

(A) Buildings.

(B) Public roadways.

(C) Railroad mainlines.

(D) Public sidewalks.

(E) Overhead power lines.

The proposed location of the dispensing station.

The location of property lines.

The locations of existing aboveground and underground tanks storing flammable and combustible liquids, and flammable, compressed or liquefied gases.

The location of the point of transfer in relationship to all of the following:

The container.

Buildings.

Public ways.

Outdoor places of public assembly.

Driveways.

Main line railroad track center lines.

The line of adjoining property that may be built upon.

Aboveground and underground tanks storing flammable and combustible liquids and/or flammable, compressed, or liquefied gases.

(b) The construction material, the dimensions and the capacity of each container.

(c) The type of container venting and pressure relief.

(d) The compressor(s) size (psig and scfm).

(e) Container appurtenances.

(f) A piping diagram showing sizes, valves, pressure relief and fittings, and control devices.

Upon acknowledged receipt of the plans, the department shall issue a plan review report within 30 days.

If the plan review report is not issued within 30 days, the installation may be constructed according to the submitted plans and shall be in compliance with these rules.

An applicant shall notify the department upon completion of the installation before the installation is placed into service. The department shall inspect the installation after receiving notification and shall certify the installation, if the requirements of the rules are met. If the inspection is not made within 2 working days, then the applicant may place the installation into service, or if intended to be underground, mounded, or partially underground, may cover the installation from sight, and shall notify the department, and shall submit a notarized affidavit to the department attesting to the fact that the installation complies with the installation application submitted and the applicable rules.

Upon the owner's request, all plans and specifications that are submitted to the department for review shall be returned after the department has certified the installation or within 30 working days after notification to the department of the completion of the installation. Plans and specifications may be marked "Confidential—Do Not Copy" at the time they are submitted.

R 29.7075 Installation application fees and annual certification.

Rule 75. Sections 1-6 to 1-6.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

1-6 Installation application fees and annual certification.

1-6.1 Only an owner of an H<sub>2</sub> container system for which an installation application is required to be submitted under section 1-5 of the H<sub>2</sub> code shall be required to pay fees as specified in 1941 PA 207, MCL 29.5.

For the purpose of assessing fees, each liquefied H<sub>2</sub> permanent installation, or any container filling location, shall be considered a container, as defined in section 5 of 1941 PA 207, MCL 29.5.

R 29.7076 Equivalency.

Rule 76. Sections 1-7 to 1-7.3 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

1-7 Equivalency.

1-7.1 Nothing in this H<sub>2</sub> code shall be intended to prevent the use of systems, methods, or devices having equivalent or superior quality, strength, fire resistance, effectiveness, durability, environmental protection capability, or safety over those prescribed by the H<sub>2</sub> code, if technical documentation is submitted to the department to demonstrate equivalency and the system, method, or device is approved for the intended purpose.

1-7.2 An owner or operator may make an application for a variance of rules by applying to the department with a satisfactory explanation of why compliance is not possible. The department may approve the variance request upon finding that the variance is based upon the best interest of public health, safety, and welfare, and the environment.

A person aggrieved by a final decision of the department on a request for variance or an equivalency determination may appeal to the circuit court within 21 days of receiving the decision.

R 29.7077 Personnel.

Rule 77. Sections 1-8 and 1-8.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Personnel.

In the interest of safety, all persons involved in handling H<sub>2</sub> shall be trained in the proper handling and operating procedures. This training shall be acceptable to the department.

*Exception: This training is not required for a person dispensing H<sub>2</sub> into a vehicle at an attended self-service facility.*

R 29.7078 Application.

Rule 78. Sections 1-9 to 1-9.4 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

**1-9 Application.**

**1-9.1 The application of this standard at places of public assembly shall meet the requirements of section 3-2.2(a) and the approval of the department.**

This standard does not apply to flow-through process containers.

H<sub>2</sub> introduced into any system covered by this code shall have a leak detection system acceptable to the department and based on the best interest of public health, safety, and welfare, and the environment.

Liquefied H<sub>2</sub> in fuel containers on vehicles and mobile equipment shall not be included in determining the maximum allowable quantities.

## Chapter 2 Design of liquefied hydrogen systems

### R 29.7079 Containers.

Rule 79. Sections 2-1 to 2-1.10.1.3 and figure 2-1.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

#### 2-1 Containers.

##### 2-1.1 H<sub>2</sub> containers shall comply with the following.

(a) Storage containers shall be designed, constructed, and tested in accordance with appropriate requirements of the ASME “*Boiler and Pressure Vessel Code*,” section VIII, “Rules for the Construction of Pressure Vessels,” adopted by reference in section 8-1.

(b) Portable containers shall be designed, constructed, and tested in accordance with title 49 *CFR*.

(c) Welding or brazing for the repair or alteration of an ASME pressure vessel shall comply with the standard adopted in section 8-1.2.1.

(d) Other welding or brazing shall be permitted only on saddle plates, lugs, or brackets which are attached to the pressure vessel by the pressure vessel manufacturer.

(e) The exchange or interchange of pressure vessel appurtenances intended for the same purpose shall not be considered a repair or alteration but must comply with these rules.

2-1.2 Permanently installed containers shall be provided with substantial supports of noncombustible material securely anchored on firm foundations of noncombustible material, and shall comply with the following subsections as applicable:

(a) Steel supports in excess of 18 inches (46 centimeters) in height shall be protected with a protective coating having a 2-hour fire resistance rating, see figure 2-1.2.

(b) If a permanently installed aboveground container is in an area that is subject to buoyant forces, provision shall be made to prevent the container, either full or empty, from floating during a rise in water level, including up to the established maximum flood stage.

(c) Horizontally installed containers shall have not more than 2 points of support longitudinally or other methods approved by the department based on the best interest of public health, safety, and welfare and the environment.

(d) Horizontally installed containers shall not be in direct contact with each other.

(e) Aboveground containers shall be protected by painting or other equivalent means where necessary to inhibit corrosion.

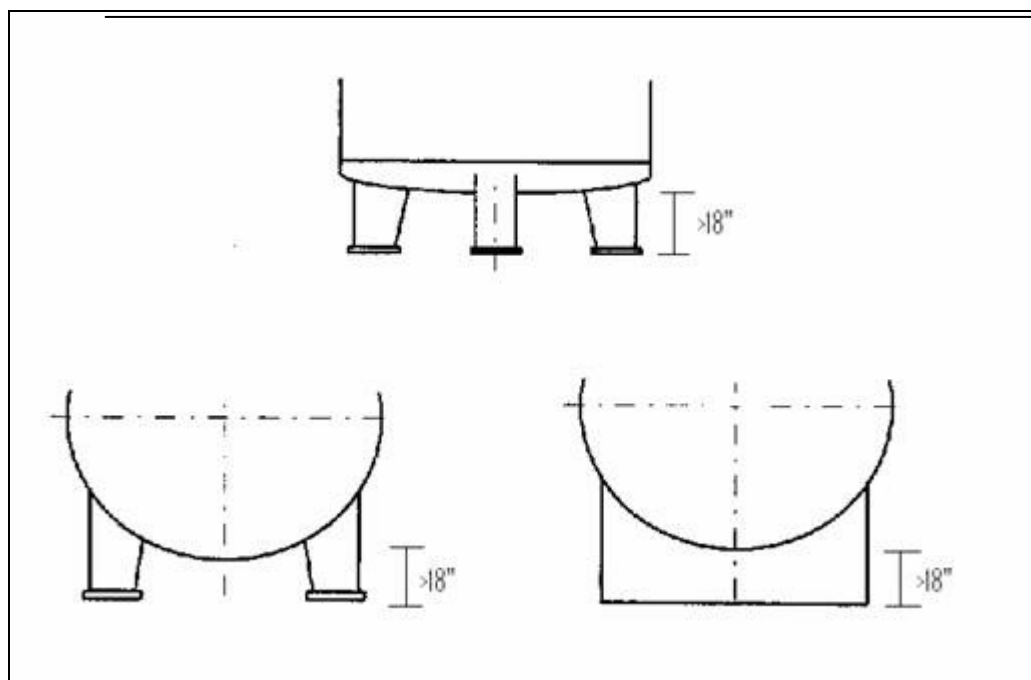
(f) Temperature effects. Foundations or supports that could come in contact with the cryogenic fluid in the event of a spillage, such as at fill connections, and flanges, shall be constructed of materials that are capable of withstanding the cryogenic temperature effects, such as concrete and stainless steel.

(g) Excessive loads. Stationary containers shall be supported to prevent the concentration of excessive loads causing differential settlement of the support system.

(h) Expansion and contraction. Foundations for horizontal containers shall be constructed to accommodate expansion and contraction of the container.

(i) Support of ancillary equipment. Foundations shall be provided to support the weight of ancillary equipment such as vaporizers and/or heat exchangers.

Figure 2-1.2



**Marking.** Liquefied H<sub>2</sub> containers and systems shall be marked in accordance with this section.

**Portable containers.** Portable containers shall be marked in accordance with CGA C-7, “*Guide to the Preparation of Precautionary Labeling and Marking of Compressed Gas Containers*,” adopted by reference in section 8.

**Stationary containers.** Stationary containers shall be marked in accordance with NFPA 704, “*Standard Systems for the Identification of the Hazards of Materials for Emergency Response*,” adopted by reference in section 8.

**Identification of contents.** Each container shall be marked as follows:

**LIQUEFIED HYDROGEN — FLAMMABLE GAS**

In letters that are not less than 3 inches (7.62 centimeters) in height.

**Container specification.** Stationary containers shall be marked with the manufacturing specification and maximum allowable working pressure on a permanent nameplate in accordance with the standard to which the container was manufactured.

An owner or operator that has had a container subjected to heat exposure due to an engulfing fire, a fire in which at least 25% of the container surface is exposed, shall remove the container from service, and shall not return the container to service, unless the owner or operator provides documentation to substantiate mechanical and performance integrity of the container in accordance with section 2-1.1 to the department. Such documentation shall be issued by a qualified engineer.

Guard posts or other approved means shall be provided to protect a container system subject to vehicular damage. When guard posts are installed, all of the following design specifications shall be met:

Guard posts shall be constructed of steel not less than 4 inches (10.16 centimeters) in diameter and shall be filled with concrete.

Guard posts shall be spaced not more than 4 feet (1.2 meters) on center.

Guard posts shall be set not less than 4 feet (1.2 meters) deep in a concrete footing that is not less than 15 inches (38.1 centimeters) in diameter.

Guard posts shall be not less than 4 feet (1.2 meters) in height above grade.

Other means as approved by the department based on the best interests of public health, safety, and welfare, and the environment.

2-1.6 Physical protection. Containers, piping, valves, pressure-relief devices, regulating equipment, and other appurtenances shall be protected against physical damage and tampering.

Portable containers subject to shifting or upset shall be secured. Nesting shall be permitted as a means of securing portable containers.

Overfill protection and prevention systems. An approved means or method shall be provided to prevent the overfilling of storage containers.

Vacuum level monitoring. An approved monitoring method shall be provided to indicate vacuum degradation within the vacuum jacket(s).

Underground containers. Underground containers for the storage of liquefied H<sub>2</sub> shall be in accordance with this subsection.

Construction. Storage containers for liquefied H<sub>2</sub> shall be designed and constructed in accordance with section VIII of ASME “*Boiler and Pressure Vessel Code*,” adopted by reference in section 8, and shall be vacuum-jacketed in accordance with section 2-1.10.1.1.

Vacuum jacket construction. The vacuum jacket shall be designed and constructed in accordance with section VIII of ASME “*Boiler and Pressure Vessel Code*,” and shall be designed to withstand the anticipated loading, including loading from vehicular traffic, where applicable. Portions of the vacuum jacket installed below grade shall be designed to withstand anticipated soil, hydrostatic, and seismic loading.

Material. The vacuum jacket shall be constructed of stainless steel or other approved corrosion-resistant material.

Corrosion protection. The underground container shall be protected by an engineered corrosion protection system designed by a corrosion expert. If cathodic protection is used the maintenance schedule shall meet the requirements of section 5-3.

#### R 29.7080 Pressure relief devices.

Rule 80. Sections 2-2.1 to 2-2.5 are reproduced from NFPA 50B, and sections 2-2.6 to 2-2.16 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

##### 2-2 Pressure relief devices.

2-2.1 Stationary liquefied hydrogen containers shall be equipped with pressure relief devices sized in accordance with CGA S-1.3, *Pressure Relief Device Standards — Part 3 — Compressed Gas Storage Containers*.

2-2.2 Portable liquefied hydrogen containers complying with DOT *Specifications and Regulations* shall be equipped with pressure relief devices as required in DOT *Specifications and Regulations*. Pressure relief devices shall be sized in accordance with the requirements of CGA S-1.1, *Pressure Relief Device Standards — Part 1 — Cylinders for Compressed Gases*, and CGA S-1.2, *Pressure Relief Device Standards — Part 2 — Cargo and Portable Containers for Compressed Gases*.

2-2.3 Pressure relief devices shall be arranged to discharge unobstructed to the outdoors and in such a manner as to prevent impingement of escaping liquid or gas upon the container, adjacent structures, or personnel. (See 3-1.5 for venting of pressure relief devices in special locations.)

2-2.4 Pressure relief devices or vent piping shall be designed or located so that moisture cannot collect and freeze in a manner that would interfere with proper operation of the device.

2-2.5 Pressure relief devices shall be provided in piping wherever liquefied hydrogen could be trapped between closures.

2-2.6 Stationary containers shall be provided with a sign, in letters not less than 1 inch (2.54 centimeters) in height, placed in proximity to the primary container pressure relief valve vent stack that warns against spraying water on or into the vent opening.

2-2.7 The pressure-relief device shall have the capacity to prevent the pressure inside the container from exceeding 110% of the maximum design pressure.

H<sub>2</sub> venting systems discharging to the atmosphere shall be in accordance with CGA G-5.5, adopted by reference in section 8.

Components which come in contact with cryogenic H<sub>2</sub> under normal operating conditions shall be suitable for operation at a temperature of -430 degrees Fahrenheit (-236 degrees Celsius).

Individual discharge lines and adapters shall be sized, located, and secured so as to permit the maximum required relief discharge capacity to minimize the possibility of physical damage. The discharge lines shall be able to withstand the pressure of the relief vapor discharge when the relief is in the full-open position.

Secondary relief devices, designed to provide additional relief in emergencies, shall be piped away from the container independently.

2-2.12 Shutoffs between pressure-relief devices and containers. Shutoff valves shall not be installed between pressure-relief devices and containers unless the valves or their use meets the requirements of this section.

2-2.12.1 Security. Shutoff valves shall be of a locking type and their use shall be limited to service-related work performed by the supplier under the requirements of ASME “*Boiler and Pressure Vessel Code*,” adopted by reference in section 8.

2-2.12.2 Multiple pressure-relief devices. Shutoff valves controlling multiple pressure-relief devices on a container shall be installed so that either the type of valve installed or the arrangement provides the full required flow through the minimum number of required relief devices at all times.

2-2.13 Safety and relief valves. Pressure relief valves for liquefied H<sub>2</sub> systems, if externally adjustable, shall be provided with a means for sealing the adjustment to prevent tampering.

2-2.13.1 If at any time it is necessary to break such a seal, the valve shall be removed from service until it has been reset and sealed.

2-2.13.2 Adjustments shall be made only by the manufacturer or other organizations having competent personnel and facilities for the repair, adjustment, and testing of such valves.

2-2.13.3 The organization making such adjustment shall attach a permanent tag with the setting, capacity, and date.

The thermal expansion relief valve shall be installed as required to prevent overpressure in any section of a liquid or cold vapor pipeline that can be isolated by valves.

Thermal expansion relief valves shall be set to discharge above the maximum pressure normally expected in the line but less than the rated test pressure of the line it protects.

Discharge from thermal expansion relief valves shall be directed so as to minimize hazard to personnel and other equipment.

Pressure relief valves shall be tested at least every 5 years.

*Exception: Thermal relief valves will not be tested.*

2-2.16 Heat exchangers, vaporizers, insulation casing surrounding containers, vessels, and coaxial piping systems in which liquefied or cold vapor H<sub>2</sub> could be trapped shall be provided with a pressure-relief device.

R 29.7081 Piping, tubing, and fittings.

Rule 81. Sections 2-3.1, 2-3.2, 2-3.4 and 2-3.5 are reproduced from NFPA 50B, and sections 2-3.2.1, 2-3.3, 2-3.5.1, 2-3.6 to 2-3.17 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

2-3 Piping, tubing, and fittings.

2-3.1 Piping, tubing, and fittings, and gasket and thread sealants shall be suitable for hydrogen service at the pressures and temperatures involved. Consideration shall be given to the thermal expansion and contraction of piping systems when exposed to temperature fluctuations of ambient to liquefied hydrogen temperatures.

Material specifications and thickness requirements for piping and tubing shall conform to ASME B31.3, *Chemical Process Piping*. Piping or tubing for operating temperatures below -20°F (-29°C) shall be fabricated from materials meeting the impact test requirements of Chapter III of ASME B31.3 when tested at the minimum operating temperature to which the piping can be subjected in service.

Aluminum shall not be used with liquefied H<sub>2</sub> piping except for ambient air vaporizers.

2-3.3 Joints in piping and tubing shall be made by welding, brazing, or flanged. Brazing materials shall have a melting point above 1,000 degrees Fahrenheit (538 degrees Celsius). Flanged connection shall use a gasket that is suitable for H<sub>2</sub>.

2-3.4 Means shall be provided to minimize exposure of personnel to piping operating at low temperatures and to prevent air condensate from contacting piping, structural members, and surfaces not suitable for cryogenic temperatures. Insulation shall be of noncombustible material and shall be designed to have a vaportight seal in the outer covering to prevent the condensation of air and subsequent oxygen enrichment within the insulation. The insulation material and outside shield also shall be of adequate design to prevent attrition of the insulation due to normal operating conditions.

2-3.5 Uninsulated piping and equipment that operate at liquefied hydrogen temperatures shall not be installed above asphalt surfaces or other combustible materials to prevent contact of liquid air with such materials. Drip pans may be installed under uninsulated piping and equipment to retain and vaporize condensed liquid air.

2-3.5.1 Where insulation materials are used, the insulation shall be compatible with the equipment with which the insulation is in contact.

2-3.6 A piping system shall be substantially supported and protected against physical damage and excessive stresses arising from settlement, vibration, expansion, or contraction. Supports for aboveground piping shall be constructed of noncombustible material.

2-3.7 Aboveground piping systems shall be protected from corrosion in compliance with recognized standards. Underground piping system shall be in compliance with section 5-3.

2-3.8 Aboveground piping systems shall be marked in accordance with the following:

(a) Marking shall include the name of the gas and direction of flow arrow.

(b) Marking for piping systems shall be provided at the following locations:

(i) At each critical process control valve.

(ii) At wall, floor, or ceiling penetrations.

(iii) At each change in direction.

(iv) At a minimum of every 20 feet (6.1 meters) or fraction thereof throughout the piping run.

2-3.9 Underground piping shall be installed on a bedding of at least 6 inches (15.24 centimeters) of well-compacted backfill material.

2-3.10 In areas subject to vehicle traffic, the pipe trench shall be of sufficient depth to permit a cover of not less than 18 inches (45.72 centimeters) of well compacted backfill material and pavement.

*Exception: In paved areas where a minimum of 8 inches (20.32 centimeters) of asphalt paving is used, the depth of the backfill between the topmost tier of piping and the paving can be reduced to not less than 8 inches (20.32 centimeters).*

*Exception: In paved areas where a minimum of 6 inches (15.24 centimeters) of reinforced concrete paving is used, the depth of backfill between the topmost tier of the piping and the paving can be reduced to not less than 4 inches (10.2 centimeters).*

2-3.11 In areas not subject to vehicle traffic, the pipe trench shall be of sufficient depth to permit 6 inches (15.24 centimeters) each of bedding and cover of well-compacted backfill material. A greater burial depth shall be provided when required by the manufacturer's instructions.

2-3.12 Piping within the same trench shall be separated by more than 3 times the diameter of the larger adjacent pipe.

Piping to equipment shall be provided with an accessible, manual shutoff valve.

Pipe, tubing, fittings, and other piping components shall be capable of withstanding a hydrostatic test of at least 3 times the rated pressure without structural failure as documented by the manufacturer.

Underground liquefied H<sub>2</sub> piping shall be vacuum-jacketed. Unjacketed piping shall not be buried and shall exit the container annular space above grade.

All natural gas piping shall be installed in accordance with R 29.4601 et seq.

All liquefied petroleum gas piping shall be installed in accordance with R 29.4001 et seq.

R 29.7082 Equipment assembly.

Rule 82. Sections 2-4.1 and 2-4.2 are reproduced from NFPA 50B, and sections 2-4.3 to 2-4.8 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

2-4 Equipment assembly.

2-4.1 Valves, gauges, regulators, and other accessories shall be suitable for liquefied hydrogen service and for the pressures and temperatures involved.

2-4.2 Installation of liquefied hydrogen systems shall be supervised by personnel familiar with proper installation practices and with their construction and use.

Aboveground containers, piping, valves, regulating equipment, and other accessories shall be readily accessible and shall be protected against physical damage and against tampering.

An automatic emergency shutoff valve shall be located in liquid product withdrawal lines as close to the container as practical.

The automatic shutoff valve shall be provided with a remotely located, manually activated, shutdown control.

The shutoff valve shall be connected to the storage container by means of welded connections without the use of flanges, or other appurtenances except that a manual shutoff valve equipped with welded connections is allowed to be installed immediately upstream of the automatic shutoff valve to allow for maintenance of the automatic valve.

Connections downstream of the shutoff valve shall be in accordance with ASME B31.3, "Boiler and Pressure Vessel Code," adopted by reference in section 8.

Cabinets or enclosures containing H<sub>2</sub> control equipment shall be ventilated to prevent any accumulations of H<sub>2</sub> gas.

R 29.7083 Testing.

Rule 83. Sections 2-5 to 2-5.2 are reproduced from NFPA 50B as follows:

2-5 Testing.

2-5.1 After installation, all field-erected piping shall be tested and proved hydrogen gas-tight at operating pressure and temperature.

2-5.2 Containers, if out-of-service in excess of 1 year, shall be inspected and tested as outlined in 2-5.1. The pressure relief devices shall be checked to determine if they are operable and properly set.

#### R 29.7084 Liquefied H<sub>2</sub> vaporizers.

Rule 84. Sections 2-6.1 to 2-6.4 are reproduced from NFPA 50B, and sections 2-6.5 to 2-6.13 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

##### 2-6 Liquefied H<sub>2</sub> vaporizers.

2-6.1 The vaporizer shall be anchored and its connecting piping shall be sufficiently flexible to provide for the effect of expansion and contraction due to temperature changes.

2-6.2 The vaporizer and its piping shall be protected on the hydrogen and heating media sections with pressure relief devices.

2-6.3 Heat used in a liquefied hydrogen vaporizer shall be indirectly supplied utilizing media such as air, steam, water, or water solutions.

2-6.4 A low-temperature shutoff switch or valve shall be provided in the vaporizer discharge piping to prevent flow of liquefied hydrogen in the event of the loss of the heat source.

Vaporizers shall be designed for a working pressure at least equal to the maximum discharge pressure of the pump or the pressurized system that supplies them, whichever is greater.

The discharge valve of each vaporizer, if provided, its piping components, the relief valves installed upstream of the discharge valve, the vaporizer piping, and related components shall be suitable for operation at a liquefied H<sub>2</sub> temperature of -423 degrees Fahrenheit (217.2 degrees Celsius).

Multiple vaporizers shall be manifolded such that both inlet and discharge block valves are installed on each vaporizer.

A low temperature switch or other accepted means shall be installed on the vaporizer discharge to eliminate the possibility of cryogenic H<sub>2</sub> entering gaseous H<sub>2</sub> containers and other equipment not designed for cryogenic H<sub>2</sub> temperatures.

Relief valves on heated vaporizers shall be located so that they are not subjected to temperatures exceeding 140 degrees Fahrenheit (60 degrees Celsius) during normal operation unless they are designed to withstand higher temperatures.

The combustion air required for the operation of integral heated vaporizers or the primary heat source for remote heated vaporizers shall be taken from outside an enclosed structure or building.

Installation of internal combustion engines or gas turbines shall conform to R 29.5101 et seq.

Securing of vaporizers. Vaporizers, heat exchangers, and similar equipment shall be secured to foundations, and their connecting piping shall be flexible to provide for the effects of expansion and contraction due to temperature changes.

Vaporizers and heaters shall be provided with instrumentation to monitor outlet temperatures.

*Exception: Ambient pressure-building coil vaporizers that are fed with liquid from, and return vapor to, a container.*

#### R 29.7085 Electrical systems.

Rule 85. Sections 2-7 to 2-7.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

##### 2-7 Electrical systems.

2-7.1 Electrical equipment and wiring shall be specified and installed in accordance with NFPA 70, “*National Electrical Code*,” adopted by reference in section 8.

Static protection shall be required when liquefied H<sub>2</sub> cargo transport vehicles are loaded or unloaded. This can be achieved when cargo transport vehicles or marine equipment are loaded or unloaded by conductive hose, flexible metallic tubing, or pipe connections where both halves of metallic couplings are in contact.

R 29.7086 Bonding and grounding.

Rule 86. Section 2-8 is reproduced from NFPA 50B as follows:

2-8 Bonding and grounding. The liquefied hydrogen container and associated piping shall be electrically bonded and grounded.

R 29.7087 Approval.

Rule 87. Sections 2-9 and 2-9.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

2-9 Approval.

Systems and all system components shall be listed or approved, including, but not limited to all of the following:

A container.

A pressure relief device, including a pressure relief valve.

A pressure gauge.

A pressure regulator.

A valve.

A vaporizer.

A hose and hose connection.

A vehicle fueling connection.

Electrical equipment related to the H<sub>2</sub> system.

A dispenser.

Emergency shutoff valves.

Metal hydride storage.

Gas detection equipment and alarms.

H<sub>2</sub> generators.

Pumps or compressors.

Stationary engine fuel system.

R 29.7088 Pressure gauges.

Rule 88. Sections 2-10 to 2-10.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Pressure gauges.

A pressure gauge, if provided, shall be capable of reading at least 1.2 times the system MAWP.

Pressure gauges shall be installed on each pump and compressor discharge.

R 29.7089 Pressure regulators.

Rule 89. Sections 2-11 to 2-11.3 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

2-11 Pressure regulators.

2-11.1 A pressure regulator inlet and each chamber shall be designed for its service pressure with a safety factor of at least 3.

2-11.2 Pressure chambers shall provide for overpressure relief, if required.

2-11.3 Regulators shall be designed, installed, or protected so that their operation is not affected by freezing rain, sleet, snow, ice, mud, insects, or debris. Regulator protection shall be permitted to be integral with the regulator.

#### R 29.7090 Valves.

Rule 90. Sections 2-12 to 2-12.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

##### 2-12 Valves.

2-12.1 Shutoff valves shall have a rated service pressure not less than the rated service pressure of the entire system and shall be capable of withstanding a hydrostatic test of at least 3 times the rated service pressure without rupture.

2-12.1.1 Leakage shall not occur when tested at least 1.1 times the rated service pressure, using an inert gas compatible with industry practices.

2-12.2 Valves of a design that allows the valve stem to be removed without removal of the complete valve bonnet or without disassembly of the valve body shall not be used.

#### R 29.7091 Hose and hose connections.

Rule 91. Sections 2-13 to 2-13.6 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

##### 2-13 Hose and hose connections.

2-13.1 Hose shall be constructed of or lined with materials that are resistant to corrosion and compatible with H<sub>2</sub>.

2-13.2 Hose, metallic hose, flexible metal hose, tubing, and their connections shall be designed for the most severe pressures and temperatures expected under normal operating conditions with a burst pressure of at least 3 times the service pressure.

2-13.3 Prior to use, hose assemblies shall be tested by the manufacturer or its designated representative at a pressure at least 1.1 times the service pressure.

Hose and metallic hose shall be distinctly marked by the manufacturer either by the manufacturer's permanently attached tag or by distinct markings indicating the manufacturer's name or trademark, applicable service identifier and design pressure.

The use of hose in an installation shall be limited to the following:

Vehicle fueling hose.

Inlet connection to compression equipment.

Section of metallic hose not exceeding 36 inches (1 meter) in length in the pipeline to provide flexibility where necessary.

2-13.6 Each section shall be so installed that it is protected against mechanical damage and is readily visible for inspection.

#### R 29.7092 Vehicle fueling connection.

Rule 92. Sections 2-14 to 2-14.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

##### 2-14 Vehicle fueling connection.

2-14.1 Fueling receptacles and nozzles for liquefied H<sub>2</sub> service shall be in accordance with a standard acceptable to the department based on the best interest of public health, safety, and welfare, and the environment.

2-14.2 The use of adapters shall be prohibited.

R 29.7093 Stationary pumps and compressors.

Rule 93. Sections 2-15 to 2-15.5 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

2-15 Stationary pumps and compressors.

Valves shall be installed such that each pump or compressor can be isolated for maintenance. Where pumps or centrifugal compressors are installed for operation in parallel, each discharge line shall be equipped with a check valve to prevent the backflow of liquid from 1 system to the other.

Foundations for cryogenic pumps or compressors shall be designed and constructed to prevent frost heaving.

Operation of all pumps and compressors shall cease when the facility's emergency shutdown device (ESD) system is initiated.

Each pump shall be provided with an adequate vent or relief valve that will prevent over pressurizing of the pump case under normal conditions including the maximum possible rate of cool down.

Vents shall be piped outside of buildings to a point of safe discharge.

R 29.7094 Liquefied H<sub>2</sub> to gaseous H<sub>2</sub> systems.

Rule 94. Sections 2-16 to 2-16.4 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Liquefied H<sub>2</sub> to gaseous H<sub>2</sub> systems.

Section 2-16 shall apply to the design, construction, installation, and operation of equipment used to produce gaseous H<sub>2</sub> from liquefied H<sub>2</sub>.

Gaseous H<sub>2</sub> storage containers and equipment located downstream of liquefied H<sub>2</sub> containers are not regulated by section 2-16. Gaseous H<sub>2</sub> storage containers and equipment shall comply with part 2 of these rules.

In addition to the emergency shutdown systems described in section 7-6, the emergency shutdown system shall also shut off the liquid supply and power to the liquefied H<sub>2</sub> transfer equipment necessary for producing gaseous H<sub>2</sub> from liquefied H<sub>2</sub>.

Transfer piping, pumps, and compressors shall be protected from vehicle collision damage and shall comply with section 2-1.5.

R 29.7095 Temporary installations.

Rule 95. Sections 2-17 and 2-17.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

2-17 Temporary installations.

2-17.1 ASME or U.S. DOT containers that are used as portable storage containers, see definition of portable container in section 1-5, for temporary, less than 6 months at any given location, stationary service shall comply with the following:

(a) If mounted on legs or supports, then such supports shall be of steel and either shall be welded to the container by the manufacturer at the time of fabrication or shall be attached to lugs that have been so welded to the container. The legs or supports or the lugs for the attachment of these legs or supports shall be secured to the container in accordance with the code or rule under which the container was

designed and built, to withstand loading in any direction equal to twice the weight of the empty container and attachments.

(b) If the container is mounted on a trailer or semitrailer running gear so that the unit can be moved by a conventional over-the-road tractor, then attachment to the vehicle, or attachments to the container to make it a vehicle, shall comply with the appropriate U.S. DOT requirements for cargo tank service. The unit also shall comply with applicable state and U.S. DOT motor carrier regulations and shall be approved by the department.

R 29.7096 Indoor fueling.

Rule 96. Section 2-18 of the storage and handling of liquefied and gaseous H<sub>2</sub> code is added as follows: 2-18 Indoor fueling. Indoor fueling of liquefied H<sub>2</sub> is not permitted unless department approved.

### Chapter 3 Location of liquefied hydrogen systems

R 29.7097 General requirements.

Rule 97. Sections 3-1.1 and 3-1.3 to 3-1.5 are reproduced from NFPA 50B, and sections 3-1.2, 3-1.6 to 3-1.13 of the storage and handling of liquefied and gaseous H<sub>2</sub> code is added as follows:

#### 3-1 General requirements.

3-1.1 The storage containers shall be located so that they are readily accessible to mobile supply equipment at ground level and to authorized personnel. Roadways or other means of access for emergency equipment, such as fire department apparatus, shall be provided.

3-1.2 Systems shall not be located beneath or where exposed by failure of the following:

(a) Electric power lines as follows:

(i) Not less than 50 feet (15.2 meters) horizontally from the vertical plane below the nearest overhead wire of an electric trolley, train, or bus line.

(ii) Not less than 5 feet (1.5 meters) horizontally from the vertical plane below the nearest overhead electrical wire.

(b) Piping containing all classes of flammable and combustible liquids

(c) Piping containing oxidizing materials

3-1.3 Where a liquefied hydrogen container is installed on ground that is level with or lower than the adjacent storage of all classes of flammable and combustible liquid or liquid oxygen, suitable protective means shall be taken to prevent accumulation of liquids within 50 ft (15.2 m) of the liquefied hydrogen container. Protective means shall include diking, diversion curbs, or grading of the flammable and combustible liquid storage or liquid oxygen storage.

3-1.4 Storage sites shall be fenced and posted to prevent entrance by unauthorized personnel. Sites also shall be placarded as follows:

**LIQUEFIED HYDROGEN FLAMMABLE GAS**

**NO SMOKING — NO OPEN FLAMES**

3-1.5 If liquefied hydrogen is located (as specified in table 3-2.1) in a separate building, in a special room, or inside buildings where not in a special room or exposed to other occupancies, containers shall have the pressure relief devices vented unobstructed to the outdoors at a minimum elevation of 25 ft (7.6 m) above grade to a safe location as required in 2-2.3.

Underground systems shall be located underground, mounded, or partially buried and outside of any buildings. Buildings shall not be constructed over any underground, mounded, or partially buried container. Sides of adjacent containers shall be separated by not less than 3 feet (1 meter).

(a) Excavation for underground, mounded, or partially buried containers shall be made with due care to avoid damage to an existing structure or its foundation. Containers shall not be installed where loads from adjacent structures may be transmitted to the container. A structure or foundation of a structure on the same property shall not be erected or constructed within 10 feet (3.1 meters) of any point on the container surface, unless the footings extend to the bottom of the container. A container shall not be installed less than 10 feet (3.1 meters) from the nearest wall of any basement, pit, or property line.

All underground containers shall be set on firm foundation and surrounded with 6 inches (15.24 centimeters) minimum of noncorrosive inert material such as clean sand or pea gravel.

Underground or mounded containers shall be covered with not less than 2 feet (60.96 centimeters) of earth or with not less than 1 foot (30.48 centimeters) of earth on top of which shall be placed a reinforced concrete slab not less than 4 inches (10.16 centimeters) thick. If containers are likely to be subjected to traffic, they shall be protected against damage from vehicles passing over them by at least 3 feet (1 meter) of earth cover plus 6 inches (15.24 centimeters) of reinforced concrete. When reinforced concrete paving is used as part of the protection, it shall extend at least 1 foot (30.48 centimeters) horizontally beyond the outline of the container in all directions.

(a) The vertical extension of the vacuum jacket required for service connections shall be allowed to extend above grade.

Containers installed in an area subject to flooding, high water table, or other buoyant forces shall be safeguarded from movement by anchoring or other means acceptable to the department based on the best interests of public health, safety, and welfare and the environment.

Where a liquefied H<sub>2</sub> container is installed on ground that is level with or lower than the adjacent storage of all classes of flammable and combustible liquid or liquid oxygen, suitable protective means shall be taken to prevent accumulation of liquids within 50 feet (15.2 meters) of the liquefied H<sub>2</sub> container. Protective means shall include diking, diversion curbs, or grading of the flammable and combustible liquid storage or liquid oxygen storage.

Aboveground liquefied H<sub>2</sub> systems shall be fenced and posted to prevent entrance by unauthorized personnel.

*Exception: Liquefied H<sub>2</sub> dispensers may be located outside the fence.*

Underground installations shall be deemed to provide engineered protection from overhead power lines.

3-1.13 Venting of underground containers. Venting systems for underground storage containers shall be in accordance with CGA G-5.5, adopted by reference in section 8.

#### R 29.7098 Specific requirements.

Rule 98. Sections 3-2.1, 3-2.4 and table 3-2.1 are reproduced from NFPA 50B, and sections 3-2.2, 3-2.2.1, 3-2.3, 3-2.5 to 3-2.8 and table 3-2.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

#### 3-2 Specific requirements.

3-2.1 The location of liquefied hydrogen storage, as determined by the maximum total quantity of liquefied hydrogen, shall be in the order of preference indicated by the Roman numerals in table 3-2.1.

Table 3-2.1

#### Preferred Locations of Liquefied Hydrogen Systems

Nature of Location	Size of Hydrogen Storage			
	39.63 gal 50 gal	to 51 gal (150 L 300 gal	to 301 gal 600 gal	to In excess of 600 gal

	to 189.25 L)	(193.03 L to 1135.5 L)	(1139.29 L to 2271 L)	(2271 L)
Outdoors	I	I	I	I
In a separate building	II	II	II	Not permitted
In a special room	III	III	Not permitted	Not permitted
Inside buildings				
Not in a special room or exposed to other occupancies	IV	Not permitted	Not permitted	Not permitted

3-2.2 The minimum distance in feet from liquefied H<sub>2</sub> systems of indicated storage capacity located either outdoors, in a separate building, or in a special room to any specified exposure shall be in accordance with table 3-2.2.

*Exception: The distances in numbers 1, 4, 6, 7, 8, and 11 in table 3-2.2 may be reduced by 2/3, but not to less than 5 feet (1.5 meters), for insulated portions of the systems. For uninsulated portions of the system, the distances may be reduced by the use of protective structures having a minimum fire resistance rating of 2 hours. The protective structure or the insulated liquefied H<sub>2</sub> container shall interrupt the line of sight between uninsulated portions of the liquefied H<sub>2</sub> storage system and the exposure.*

(a) An aboveground H<sub>2</sub> storage container system shall be erected per table 3-2.2 but not less than 75 feet (22.9 meters) from any of the following:

A school.

A church.

A hospital.

A theater.

Assembly occupancy for 50 or more persons.

*Exception: The restrictions in section 3-2.2(a) shall not apply to an aboveground H<sub>2</sub> system used exclusively for stationary power generation.*

Loose or piled combustible materials and weeds and long dried grass shall not be permitted within 10 feet (3.1 meters) of any system.

Table 3-2.2

Minimum Distance from Liquefied Hydrogen Systems to Exposures

Type of Exposure	Total Liquefied H <sub>2</sub> Storage		
	39.63 gal to 3,500 gal (ft)	3,501 gal to 15,000 gal (ft)	15,001 gal to 75,000 gal (ft)
1. Building or structure			
(a) Wall(s) adjacent to system constructed of non-combustible or limited-combustible materials			
(1) Sprinklered building or structure or unsprinklered building or structure having noncombustible contents	5 <sup>a</sup>	5 <sup>a</sup>	5 <sup>a</sup>
(2) Unsprinklered building or structure	25	50	75

with combustible contents.

Adjacent wall(s) with fire resistance rating less than 3 hours<sup>b</sup>

Adjacent wall(s) with fire resistance rating of 3 hours or greater <sup>b</sup>	5	5	5
(b) Wall(s) adjacent to system constructed of combustible materials	50	50	50
(1) Sprinklered building or structure	50	75	100
(2) Unsprinklered building or structure	50	75	100
2. Wall openings			
(a) Openable	75	75	75
(b) Unopenable	25	50	50
3. Air compressor intakes or inlets for air-conditioning or ventilating equipment	75	75	75
4. All classes of flammable and combustible liquid containers (above ground, and vent or fill openings if below ground) ( <i>see 3-1.3</i> ) <sup>c</sup>	50	75	100
5. Between stationary liquefied H <sub>2</sub> containers	5	5	5
6. Flammable gas storage other than H <sub>2</sub>	50	75	75
7. Liquid oxygen storage and other oxidizers ( <i>see 3-1.3</i> )	75	75	75
8. Combustible solids	50	75	100
9. Open flames and welding	50	50	50
10. Places of public assembly for 50 or more persons	75	75	75
11. Public ways, railroads, and property lines	25	50	75
12. Inlet to underground sewers	10	10	10
13. Places of public assembly less than 50 people	25	50	50
14. Flammable/Combustible liquid dispenser other than H <sub>2</sub>	10	10	10

For SI units: 1 ft = 0.305 m; 1 gal = 3.785 L.

a Portions of wall less than 10 ft (3 m) (measured horizontally) from any part of a system shall have a fire resistance rating of at least 1/2 hour.

b Exclusive of windows and doors.

c Distances can be reduced to 15 ft (4.6 m) for class IIIB combustible liquids.

3-2.3 Cargo transport unloading. Unloading connections on delivery equipment shall not be positioned closer to any of the exposures cited in table 3-2.2 than the distances given for the storage system. The following shall apply:

(a) For stationary container system installations or stationary multiple container systems utilizing a common or manifolded transfer line, or railroad tank car transfer systems to fill trucks with no stationary storage involved shall comply with all of the following:

(i) Owners and operators shall ensure that fixed piping is used between the container and master shutoff and check valves. The piping and manifolds shall be secured to the container frame. Flexible hoses are permitted between the check valve and the cargo vehicle unloading connection.

*Exception: Bulkheads will be located at a minimum of 1.5 feet (45.72 centimeters) when crash protection is provided at 10 feet (3.1 meters) from storage container.*

(ii) Emergency shutoff valves required in this section shall be tested annually for proper operation. The results of the tests shall be documented.

(iii) All installations shall have at least 1 clearly identified and easily accessible manually operated remote emergency shutoff device. Within 1 year after the effective date of these rules, existing installations shall have at least 1 clearly identified and easily accessible manually operated remote emergency shutoff device. The emergency shutoff device shall be located not less than 20 feet (6.1 meters) nor more than 100 feet (30.5 meters) in the path of egress from the emergency shutoff valve and not less than 20 feet (6.1 meters) from the container system.

(iv) During transfer of H<sub>2</sub> to and from cargo vehicles, the hand or emergency brake of the vehicle shall be set, and chock blocks shall be used to prevent rolling of the vehicle.

(v) Transfer systems shall be capable of depressurizing to facilitate disconnection. Bleed connections shall lead to a safe point of discharge.

(vi) Cargo vehicle shall be equipped with air-brake interlock in front of the unloading connection to protect against drive-away.

(b) The delivery vehicle shall be located so that all parts of the vehicle are on the premises when delivery is made, and shall comply with all of the following:

Vent connections shall be provided so that loading arms and hoses can be depressurized and vented prior to disconnection if necessary. The connections for liquefied H<sub>2</sub> shall be piped to a vent stack in accordance with part 2, section 2-2.2.

When transfers are made into fueling facility containers, the liquefied H<sub>2</sub> shall be transferred at a pressure that shall not over-pressurize the receiving container.

The transfer piping shall be equipped with a check valve to prevent backflow from the container being filled to the transport vehicle. Check valve shall be located as close as practicable to the container.

If the fueling facility container or transfer equipment is located in a remote area relative to the delivery vehicle operating status indicators, that is those that indicate container level, these container status indicators shall be provided in the unloading area.

At least 1 qualified person shall be in continuous attendance and shall have an unobstructed view of the transfer point while unloading is in progress.

Sources of ignition shall not be permitted in the unloading area while transfer is in progress.

The cargo transport vehicle's engine shall be shut off while the transfer hose or piping is being connected or disconnected. If required for liquefied H<sub>2</sub> trailer pumping transfer, the engine pump drive motor may be started and used during the liquid transfer operations.

3-2.4 The minimum distance of container fill connections from parked vehicles shall be 25 ft (7.6 m).

3-2.5 An owner and operator shall ensure that a container systems are properly designed and constructed in accordance with the ASME and that any portion, which is underground, mounded, or partially underground, is protected from corrosion by either of the following:

(a) The ASME approved container system is cathodically protected by all the following requirements:

(i) The ASME approved container system is coated with a suitable dielectric material approved by the department.

(ii) Factory-installed or field-installed cathodic protection systems are designed by a corrosion expert or in accordance with the NACE recommended practice RP0285 entitled "*Corrosion Control of Underground Storage Tank Systems by Cathodic Protection*" or impressed current systems are designed to allow a determination of current operating status as required in section 5.4-1 of the H<sub>2</sub> code.

(iii) Cathodic protection systems are operated and maintained in accordance with the provisions of section 5.4-1 of the H<sub>2</sub> code.

(b) Other method as approved by the department and in the best interest of public health, safety, and welfare, and the environment.

### 3-2.6 Out-of-service aboveground containers.

3-2.6.1 Containers that are no longer in service for a period of 12 months shall be closed. To close the aboveground container, the owner or operator shall empty the container, purge it with an inert gas and safeguard it against tampering. Piping that is removed from service shall be purged with an inert gas and capped or removed.

3-2.6.2 Each container that is to be reused at the original location or a new location shall be purged with an inert gas and be in compliance with all the requirements for the installation of a new container, and shall be recertified by the manufacturer, or authorized representative, and tested in accordance with the container's design specifications or be pressure tested with an inert gas or H<sub>2</sub> at 1.1 times the maximum working pressure for not less than 10 minutes. Piping that is to be reused shall be in compliance with all the requirements for the installation of new piping and shall be tested in compliance with section 3-2.8 of this code prior to being brought back into service.

### 3-2.7 Out-of-service underground, mounded, and partially buried containers.

3-2.7.1 Containers that are no longer used to store H<sub>2</sub> and are not intended to be brought back into service shall be permanently closed. To permanently close the container, the container shall be emptied and purged with an inert gas to render the container free of H<sub>2</sub>, and then the container shall be removed from the ground. When a structure above or near the container prevents removal, the container shall be emptied and purged with an inert gas to render the container free of H<sub>2</sub>, then the container shall be filled with an inert solid material. Piping that is permanently removed from service shall be purged with an inert gas and capped or removed.

3-2.7.2 Containers may be rendered temporarily out-of-service only when it is intended they be brought back into service at a later date. To temporarily close a container, all of the following requirements shall be met:

- (a) The container shall be emptied and purged with an inert gas.
- (b) Corrosion protection for the container and all underground piping shall be maintained in compliance with section 5-4.1 of this code.
- (c) The vent line shall remain functional.
- (d) The container shall be secured against tampering.
- (e) Piping that is temporarily removed from service shall be purged with an inert gas and capped.

3-2.7.2.1 Each container that is temporarily out-of-service greater than 12 months shall be pressure tested with an inert gas at 1.1 times the maximum working pressure for not less than 10 minutes prior to being brought back into service. Temporarily out-of-service piping shall be tested in compliance with section 3-2.8 of this code prior to being brought back into service.

3-2.8 Testing. After installation, prior to being placed into service, all container connections, piping, tubing, hose, and hose assemblies shall be tested by an approved method as outlined in ASME B31.3 "*Boiler and Pressure Vessel Code*," adopted by reference in section 8, or by a method acceptable to the department based on the best interest of public health, safety, and welfare, and the environment.

R 29.7099 Handling of liquefied H<sub>2</sub> inside buildings other than separate buildings and special rooms.

Rule 99. Sections 3-3 and 3-3.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Handling of liquefied H<sub>2</sub> inside buildings other than separate buildings and special rooms.

3-3.1 Portable liquefied H<sub>2</sub> containers of 50-gallons (189-Liters) or less capacity as permitted in Table 3-2.1 and in compliance with section 3-1.5 where housed inside buildings not located in a special room and exposed to other occupancies shall comply with the following minimum requirements.

(a) Containers shall be located 20 feet (6.1 meters) from all classes of flammable and combustible liquids and readily combustible materials such as excelsior or paper.

(b) Containers shall be located 15 feet (4.6 meters) from ordinary electrical equipment, and 25 feet (7.6 meters) from open flames, welding or other sources on ignition.

(c) Containers shall be located 50 feet (15 meters) from storage of oxidizing gases.

(d) Containers shall be protected against damage or injury due to falling objects or work activity in the area.

(e) Containers shall be firmly secured and stored in an upright position and protected against damage in accordance with the provisions of section 2-1.7.

(f) Pressure relief devices on the containers shall be vented directly outdoors or to a hood that is suitable for flammable and combustible vapors.

R 29.7100 Location of dispensing operations and equipment.

Rule 100. Sections 3-4 to 3-4.4 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Location of dispensing operations and equipment.

Dispensing equipment located outdoors shall be in accordance with the following:

Dispensing equipment shall be allowed under weather protection in accordance with the requirements of section 4-5 and constructed in a manner that prevents the accumulation of H<sub>2</sub> gas.

Dispensing equipment shall not be beneath electric power lines or where exposed by their failure, and shall be a minimum of 10 feet (3.1 meters) from the nearest important building or property line or 20 feet (6.2 meters) from any activity that involves a fixed source of ignition.

Dispensing equipment shall be located so that all parts of the vehicle being served are on the premises of the motor fuel dispensing facility.

Dispensing equipment shall be protected against collision damage by means acceptable to the department. Dispensing devices shall be securely bolted in place. Dispensing devices shall be installed in accordance with manufacturer's instructions.

R 29.7101 Installation of emergency shutdown equipment.

Rule 101. Sections 3-5 to 3-5.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Installation of emergency shutdown equipment.

Breakaway protection shall be provided in a manner such that, if a pullaway event occurs, liquefied H<sub>2</sub> will cease to flow at any separation.

A breakaway device shall be installed at every dispensing point. Such a device shall be arranged to separate by a force not greater than 150 pounds (75 kilograms), when applied in any direction that the vehicle would move. Breakaway devices shall be compatible with a standard acceptable to the department.

#### Chapter 4 Design considerations at specific locations

R 29.7102 Outdoor locations.

Rule 102. Sections 4-1 to 4-1.4 are reproduced from NFPA 50B as follows:

#### 4-1 Outdoor locations.

4-1.1 Roadways and yard surfaces located below liquefied hydrogen piping as well as areas under the fill connections and delivery vehicle's uninsulated hydrogen piping from which liquid air can drip shall be constructed of noncombustible materials. For the purposes of this standard, asphaltic and bitumastic paving shall be considered combustible. If expansion joints are used, fillers also shall be of noncombustible materials.

4-1.2 If walls, roofs, weather shelters, or canopies are provided, they shall be constructed of noncombustible or limited-combustible materials.

4-1.3 Electrical wiring and equipment shall comply with section 2-7.

4-1.4 Lighting shall be provided for nighttime transfer operation.

#### R 29.7103 Specific requirements.

Rule 103. Sections 4-2 to 4-2.2.3 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

##### 4-2 Specific requirements.

The location of liquefied H<sub>2</sub> storage, as determined by the maximum total quantity of liquefied H<sub>2</sub>, shall be in accordance with table 3-2.1.

Installation of liquefied H<sub>2</sub> inside buildings other than detached buildings and gas rooms.

4-2.2.1 More than 1 system of 50 gallons (189.5 liters) or less capacity may be installed in the same room or area outside of special rooms located as allowed in table 3-2.1 and in compliance with section 4-2.1, provided the systems are separated by at least 50 feet (50.2 meters) or by a full height fire-resistive partition having a minimum fire resistance rating of 2 hours is located between the systems.

The separation distance between multiple systems of 50 gallons (189.5 liters) or less may be reduced to 25 feet (7.6 meters) in buildings where the space between storage areas is free of combustible materials and protected with a sprinkler system.

When sprinkler protection is provided, the area in which the H<sub>2</sub> is stored or used shall be protected with a sprinkler system designed to be not less than that required by NFPA 13 for extra hazard group 1 with a minimum design area of 2,500 square feet (762 square meters).

#### R 29.7104 Separate buildings.

Rule 104. Sections 4-3 to 4-3.5 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

##### 4-3 Separate buildings.

4-3.1 Separate buildings containing more than 300 gallons (1137 liters) of liquefied H<sub>2</sub> shall be constructed of noncombustible or limited-combustible materials on a substantial frame. Walls and roofs shall be lightly fastened. All venting elements shall be designed to relieve at a maximum pressure of 25 pounds/square foot. Doors shall be located in such a manner that they are readily accessible to personnel in an emergency.

*Exception: Window glazing may be of plastic.*

*Exception: Explosion venting shall be in accordance with section 4-4.3.*

Ventilation to the outdoors shall be provided. Inlet openings shall be located within 18 inches (45.72 centimeters) of the floor in exterior walls only. Outlet openings shall be located at the high point of the room in exterior walls or roof. Both the inlet and outlet vent openings shall have a minimum total area of 1 square foot/1000 cubic foot (0.3 square meters/305 cubic meters) of room volume. Discharge from outlet openings shall be directed or conducted to a location that allows for dissipation of the exhaust air in the ambient surroundings away from air intakes and occupied spaces.

4-3.3 There shall be no sources of ignition within the room or area where the H<sub>2</sub> system is installed.

4-3.4 Electrical wiring and equipment shall comply with section 2-7.

*Exception: All electrical wiring and equipment in the separate building shall be class I, division 2, group B.*

4-3.5 Heating, if provided, shall be by indirect means such as steam or hot water.

*Exception: Electrical heating shall be in accordance with section 4-3.4.*

#### R 29.7105 Special rooms.

Rule 105. Sections 4-4 to 4-4.9.1, and table 4-4.9 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

##### 4-4 Special rooms.

4-4.1 Floors, walls, and ceiling shall be constructed of noncombustible or limited-combustible materials. Interior walls or partitions shall have a fire resistance rating of at least 2 hours, shall be continuous from floor to ceiling, and shall be securely anchored. At least 1 wall shall be an exterior wall. Windows and doors shall be located so as to be readily accessible in case of emergency.

*Exception: Window glazing may be of plastic.*

Access from within the primary structure shall be made through 1 vapor-sealing, 2 hour, self-closing fire door.

4-4.2 Ventilation shall be provided as in section 4-4.3.

4-4.3 Deflagration venting shall be provided in exterior walls or roof only.

4-4.3.1 Vents shall be any 1 or any combination of the following:

- (a) Walls of light material.
- (b) Lightly fastened hatch covers.
- (c) Lightly fastened, outward opening doors in exterior walls.
- (d) Lightly fastened walls or roof.
- (e) Other methods in accordance with NFPA 69, adopted by reference in section 8.

Where applicable, snow loads shall be considered.

4-4.3.3 The venting area shall be equal to not less than 1 cubic foot/30 cubic feet (1 cubic meter/9 cubic meters) of room volume.

4-4.4 There shall be no sources of ignition.

4-4.5 Electrical wiring and equipment shall comply with section 2-7, except that all electrical wiring and equipment in the special room shall be class I, division 2, group B.

4-4.6 Heating, if provided, shall be by steam, hot water, or other indirect means.

*Exception: Electrical heating shall be in accordance with section 4-4.5.*

##### 4-4.7 Room ventilation.

4-4.7.1 The ventilation shall be at least 1 cubic foot/minute/square foot of room area, but not less than 1 cubic foot/minute/12 cubic feet of room volume and shall be designed such that an accumulation of H<sub>2</sub> at a concentration equal to or greater than 25% of the lower flammable limit shall not occur in any part of the room.

4-4.7.2 Ventilation shall be by a continuous mechanical ventilation system or by a mechanical ventilation system activated by a continuously monitoring H<sub>2</sub> detection system where a gas concentration of not more than 25% of the lower flammable limit is present.

4-4.7.3 Where installed, a gas detection system shall be equipped to sound an alarm and visually indicate when a maximum of 25% of the lower flammable limit is reached.

Any failure of the ventilation system shall immediately shut down the fueling system and provide notification to the system operator. Reactivation of the fueling system shall be by manual restart and shall be conducted by trained personnel.

The gas detection system shall function during ventilation system maintenance operations.

A ventilation system for a room within or attached to another building shall be designed to ensure that all areas serviced by the ventilation system meeting performance requirements in accordance with section 4-4.7 during the normal operating conditions and during alarm conditions.

Warning signs.

Access doors shall have warning signs with the words “WARNING – NO SMOKING – NONORDORIZED FLAMMABLE GAS - CRYOGENIC LIQUID – COLD GAS – NO OPEN FLAMES.” The wording shall be in plainly legible, bright red letters not less than 1 inch (2.54 centimeters) high on a white background.

Indoor attended fast-fill fueling.

4-4.9.1 Attended indoor fast-fill fueling system shall be in accordance with subsections (a) to (l) of this section.

(a) Gas storage equipment shall be located outdoors unless approved by the department. Gas processing and compression equipment shall be listed or approved for indoor use or located outdoors.

(b) An emergency manual shutdown device shall be located in the dispensing area not less than 20 feet (6.1 meters) and not more than 100 feet (30.5 meters) in the path of egress from the dispensing area. Actuation of the emergency manual shutdown device shall perform in accordance with subsection (i) of this section.

(c) The dispenser shall be equipped with a gas detection system which shall actuate in accordance with subsection (i) of this section when a maximum of 25% of LFL is detected (1% H<sub>2</sub> in air).

(d) The dispenser shall be equipped with a leak detection system capable of identifying a leak from the dispensing system outside the dispenser housing by conducting a pre-fill pressure test. The leak detection must be capable of detecting a minimum leak rate of 1.9 gallon/minute (7.2 liter/minute) and shall actuate in accordance with subsection (i) of this section when a leak is detected.

(e) The dispenser communication system shall monitor fuel tank temperature and shall actuate in accordance with subsection (i) of this section when the temperature exceeds the design temperature of the onboard fuel storage system. In the event that the fill is non-communicated, the owner/operator must demonstrate that non-communicated fills are protective of the temperature limits of the on-board fuel system during fueling.

(f) The dispenser communication system shall monitor dispensed fuel pressure and shall actuate in accordance with subsection (i) of this section when pressure exceeds anticipated fuel pressure for the onboard fuel storage system. In the event that the fill is non-communicated, the owner/operator must demonstrate that non-communicated fills are protective of the pressure limits of the on-board fuel system during fueling.

(g) The dispensing area shall be equipped with a fire detection system and shall actuate in accordance with subsection (i) of this section if a fire is detected.

(h) A ventilation system shall be installed for the dispensing area. The ventilation system shall be capable of delivering ventilation air as provided in section 4.3.7. The ventilation system shall operate prior to dispenser operation, during fueling, and for at least 1 minute after fueling has been completed. The ventilation flow rate shall be monitored. Failure or reduction of the ventilation flow rate below the required flow rate shall shut down the dispensing system.

*Exemption: For communication fills, dispensing area ventilation system is not required for fuel delivery per refueling event if less than those listed in table 4-4.9.*

Table 4-4.9

Room Size (m3)	Maximum fuel delivery per refueling event that does not require room ventilation (kg)
1000	0.8
2000	1.7
3000	2.5
4000	3.3
5000	4.2

(i) The actuation of any 1 of the systems listed in subsections (b) to (h) of this section shall shut down the dispenser, stop the flow of gas into the room, and start or continue to run the ventilation system, if required, it shall be in accordance with table 4-4.9.

(1) Reactivation of the dispenser and gas flow into the room shall be by manual restart and shall be conducted by trained personnel.

(j) Interior walls, doors, and window openings within 15 feet (4.6 meters) of the dispenser shall be constructed of materials having a fire rating of at least 2 hours. Wall penetrations shall require use of listed fire-rated equipment.

(k) The owner/operator shall not allow hot work/open flames within 15 feet (4.6 meters) of the refueling location unless the dispenser is shut down, depressurized, and purged.

(l) If H<sub>2</sub> is to be removed from the vehicle storage system, H<sub>2</sub> shall be discharged into a closed transfer system or vented outdoors in accordance with CGA G-5.5, “*Hydrogen Vent Systems*,” as adopted by reference in section 8.

#### R 29.7106 Canopies.

Rule 106. Sections 4-5 to 4-5.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

##### 4-5 Canopies.

4-5.1 A container installation that has a canopy or roof shall have prior approval by the department based on the best interests of public health, safety, and welfare and the environment. This canopy or roof shall not limit the dissipation of heat or dispersion of flammable vapors and cannot restrict firefighting access and control.

4-5.2 A roof or canopy shall meet all of the following conditions:

(a) The lowest elevation of the roof or canopy shall not be less than 4 feet (1.8 meters) from the top of the container.

(b) All container vent(s) are extended through the roof or canopy.

(c) The roof or canopy is constructed in such a way that it will not allow for vapors to accumulate under the canopy or roof.

(d) Constructed of non-combustible materials.

#### R 29.7107 Outdoor fill station.

Rule 107. Sections 4-6 to 4-6.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

##### 4-6 Outdoor fill station.

4-6.1 Each line between a liquid storage facility and a dispenser at a fill station shall have a valve that closes when 1 of the following occurs:

The power supply to the dispenser is cut off.

Any emergency shutdown device at the refueling station is activated.

A manual shutoff valve shall be provided at a fill station upstream of the breakaway device specified in section 3-5, where it is readily accessible to the person dispensing H<sub>2</sub>, unless 1 of the following occurs:

(a) The self-closing valve referred to in section 4-6.1 is located immediately upstream of the dispenser.

(b) The dispenser is equipped with a self-closing valve that closes each time the dispenser is turned to the off position or when an emergency device is activated.

## Chapter 5 Operation

R 29.7108 Operation.

Rule 108. Section 5-1 is reproduced from NFPA 50B, and sections 5-1.1 to 5-1.9 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Operation. For installations that require any operation of equipment by the user, instructions shall be maintained at operating locations.

Where an overpressure incident that results in operation of the overpressure protection system of the dispenser occurs, the dispenser pressure control system shall be examined and certified by a qualified operator prior to being returned to service.

Liquefied H<sub>2</sub> fueling facilities shall be designed so that, in the event of a power failure, the system shall go into fail-safe condition.

The maximum delivery pressure at the vehicle tank inlet shall not exceed the maximum allowable pressure of the vehicle fuel tanks.

Hose and arms shall be equipped with a shutoff valve at the fuel end and a breakaway device that meets the requirements of section 3-5 to minimize release of liquid and vapor in the event that a vehicle pulls away while the hose remains connected. Such a device shall be installed and maintained in accordance with the manufacturer's instructions.

When not in use, hose shall be secured to protect it from damage.

Where a hose or arm of nominal 3 inches (7.62 centimeters) diameter or larger is used for liquid transfer or where 1 of nominal 4 inches (10.16 centimeters) diameter or larger is used for vapor transfer, an emergency shutoff valve shall be installed in the piping of the transfer system within 10 feet (3.1 meters) from the nearest end of the hose or arm.

Where either a liquid or vapor line has 2 or more legs, an emergency shutoff valve shall be installed either in each leg or in the line before the legs.

Bleed or vent connections shall be provided so that loading arms and hose can be drained and depressurized prior to disconnection, if necessary. These bleed or vent connections shall lead to a safe point of discharge.

A fueling connector and mating vehicle receptacle shall be used for reliable, safe, and secure transfer of liquefied H<sub>2</sub> or gas vapor to or from the vehicle with minimal leakage.

The fueling connector either shall be equipped with an interlock device that prevents release while the line is open or shall have self-closing ends that automatically close upon disconnection.

The transfer of liquefied H<sub>2</sub> into vehicular onboard fuel supply containers shall be performed in accordance with the manufacturer's instructions. The dispenser manufacturer's instructions shall be posted at the dispensing device.

R 29.7109 Maintenance.

Rule 109. Sections 5-2 to 5-2.11 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Maintenance.

5-2.1 Hoses, nozzles, and breakaways shall be examined visually to ensure that they are safe for use and shall be maintained in accordance with manufacturer's instructions on at least a quarterly basis, or if required by the manufacturer.

Hose shall be tested for leaks per manufacturer's requirements, and any leakage shall be a reason for rejection and replacement.

Testing shall be carried out with helium or with helium/ H<sub>2</sub> blend as the test gas or if this is not possible, with H<sub>2</sub> using suitable precautions.

The facility operator shall maintain a maintenance log in good condition and accessible to department inspection. Records shall be maintained for a minimum of 2 years.

Controllers on fuel stations shall be designed to verify the integrity of the fuel hose, breakaway, nozzle, and receptacle by pressurizing these components to at least the vehicle back pressure and checking pressure drop prior to the start of fueling.

Containers and their appurtenances, piping systems, compression equipment, controls, and detection devices shall be maintained in operating condition and according to manufacturer's instructions.

Pressure relief valves shall be maintained in operating condition.

Maintenance personnel shall be trained in leak detection procedures.

Area within 10 feet (3.1 meters) of dispenser shall be free from debris, weeds and other material that present a fire hazard.

Safety, gas detection, and fire protection equipment shall be tested or inspected at intervals not to exceed 6 months.

Maintenance activities on fire control equipment shall be scheduled so that a minimum of equipment is taken out of service at any 1 time and fire prevention safety is not compromised.

R 29.7110 Cathodic protection maintenance.

Rule 110. Sections 5-3 and 5-3.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

5-3 Cathodic protection maintenance.

5-3.1(a) Owners and operators shall ensure that all metallic container systems that are underground, mounded, or partially underground are protected and maintained to minimize corrosion as cited in the NACE standard RP0169 entitled "*Recommended Practice, Control of External Corrosion of Underground or Submerged Metallic Piping Systems*" and NACE recommended practice RP0285 entitled "*Corrosion Control of Underground Storage Tank Systems by Cathodic Protection*," adopted by reference in section 8.

(b) All corrosion protection systems shall be operated and maintained to continuously provide corrosion protection to the metal components of the portion of the ASME approved container system that routinely contains liquid H<sub>2</sub> and that is in contact with the ground.

(c) All container systems equipped with cathodic protection systems shall be inspected for proper operation by a NACE certified cathodic protection tester as defined in section 1-3. The H<sub>2</sub> system shall be tested within 6 months of installation and at least once each calendar year at intervals not to exceed 15 months.

(d) Container systems equipped with impressed current cathodic protection systems shall be inspected by the owner every 60 days to ensure that the equipment is operating within design specifications. The design limits shall be readily available.

(e) If container systems are equipped with cathodic protection, then the owner or operator shall maintain records to demonstrate that the cathodic protection is in compliance with the performance standards of this section. The records shall provide both of the following:

(i) The results of the last 3 inspections required in subsection (d) of this section.

(ii) The results of testing from the last 2 inspections required in subsection (c) of this section.

(f) Within 6 months following the repair of any cathodically protected container system, where the repairs may affect the operation of the cathodic protection system, the system shall be tested in accordance with subsections (c) and (d) of this section to ensure that it is operating properly.

(g) Repairs or replacement of a cathodic protection system shall be conducted by a NACE certified corrosion expert as defined in section 1-3. General system maintenance of the cathodic protection system including, but not limited to, replacement of fuses, and splicing of cable would not be required to be designed by a corrosion expert and shall be approved by the department to not increase the hazard to public health, safety, and welfare and the environment.

R 29.7111 Stray or impressed currents and bonding.

Rule 111. Sections 5-4 to 5-4.3 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Stray or impressed currents and bonding.

Where stray or impressed currents are used or can be present on dispensing systems, such as cathodic protection, protective measures to prevent ignition shall be taken.

5-4.2 Static protection between the fuel dispenser and the vehicle shall not be required where H<sub>2</sub> is transferred by conductive hose, flexible metallic tubing, or pipe connections where both halves of the metallic couplings are in continuous contact.

The transfer surface shall be concrete or shall have a resistivity not exceeding API RP 2003, "*Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents*," adopted by reference in section 8, performance criteria of 1 megohm as measured using a method acceptable to the department, such as EN 1081:1998 "*Resilient Floor Coverings – Determination of the Electrical Resistance*," adopted by reference in section 8.

R 29.7112 Emergency plan.

Rule 112. Sections 5-5 to 5-5.1.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

5-5 Emergency plan.

5-5.1 Emergency plan requirements.

5-5.1.1 An emergency plan shall be prepared and updated wherever gaseous or liquefied H<sub>2</sub> are produced, handled, stored, or used.

The plan shall be available to the department for inspection upon reasonable notice and shall include all of the following information:

(a) The type of emergency equipment available and its location.

(b) A brief description of any testing or maintenance programs for the available emergency equipment.

(c) An indication that hazard identification labeling is provided for each storage area.

(d) Location of posted emergency procedures.

- (e) A material safety data sheet (MSDS or equivalent) that is available for the gaseous or liquefied H<sub>2</sub> stored or used on the site.
- (f) A list of personnel or a site operating authority who are designated and trained to be liaison personnel for the fire department and who are responsible for but shall not be limited to the following:
  - (i) Aiding the emergency responders in pre-emergency planning.
  - (ii) Identifying the location of the gaseous and liquefied H<sub>2</sub> stored or used.
  - (iii) Accessing material safety data sheets.
  - (iv) Knowledge of the site emergency procedures.
- (g) A list of types and quantities of gaseous and liquefied H<sub>2</sub> found within the facility.

R 29.7113 Release of H<sub>2</sub>.

Rule 113. Sections 5-6 to 5-6.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Release of H<sub>2</sub>.

Records of unexpected discharges. Accurate records of the unexpected discharge of gaseous or liquefied H<sub>2</sub> shall be kept by the facility and made readily available upon request. Records shall be kept for a minimum of 2 years.

Container failure. When an unexpected discharge due to primary container failure is discovered the department and the local fire department, shall be immediately notified, and the container shall be repaired or be removed from service.

R 29.7114 Security.

Rule 114. Sections 5-7 and 5-7.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Security.

5-7.1 Liquid H<sub>2</sub> and compressed gas cylinders, containers, and systems shall be secured against accidental dislodgement and against access by unauthorized personnel.

R 29.7115 Leaks, damage, or corrosion.

Rule 115. Sections 5-8 and 5-8.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Leaks, damage, or corrosion.

Leaking, damaged, or corroded, liquid or gaseous H<sub>2</sub> systems shall be removed from service, replaced or repaired.

Chapter 6 Fire protection

R 29.7116 Cautionary information.

Rule 116. Sections 6-1 to 6-1.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

6-1 Cautionary information.

6-1.1 Hazard identification signs shall be conspicuously placed at all locations where H<sub>2</sub> is produced, stored, used, or handled.

6-1.2 Ratings shall be assigned in accordance with NFPA 704, "*Standard System for the Identification of the Hazards of Materials for Emergency Response*," adopted by reference in section 8.

R 29.7117 Signs.

Rule 117. Sections 6-2 to 6-2.3 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

6-2.1 Signs prohibiting smoking or open flames within 25 feet (7.6 meters) shall be provided where H<sub>2</sub> is produced, stored, or used.

6-2.2 A sign with the following legends printed in red capital letters on a white background shall be conspicuously posted as follows:

“NON-ODORIZED FLAMMABLE GAS – CRYOGENIC LIQUID or COLD GAS – NO SMOKING – NO OPEN FLAMES”

All lettering on signage shall be 3 inches (7.62 centimeters) or more.

*Exception: This does not apply to motor vehicle dispensing per sections 7.2.13 and 4-4.8.1.*

6-2.3 Identification signs. Visible hazard identification signs shall be provided in accordance with NFPA 704, “*Standard System for the Identification of the Hazards of Materials for Emergency Response*”, adopted by reference in section 8.1.1, at entrances to buildings or areas in which liquefied H<sub>2</sub> is stored, handled or used.

R 29.7118 Fire extinguisher.

Rule 118. Section 6-3 of the storage and handling of liquefied and gaseous H<sub>2</sub> code is added as follows:

6-3 A portable fire extinguisher(s) having a rating of not less than 40-B:C or 2-20-B:C shall be located within 75 feet (22.9 meters) from the pumps, dispensers, and container fill openings. Fire extinguishers shall be inspected and maintained according to NFPA 10, “*Standard for Portable Fire Extinguishers*,” adopted by reference in section 8-1.1.

R 29.7119 Sprinkler protection.

Rule 119. Section 6-4 of the storage and handling of liquefied and gaseous H<sub>2</sub> code is added as follows:

6-4 When sprinkler protection is provided, the area in which H<sub>2</sub> is stored or used shall be protected with an automatic sprinkler system designed to be not less than that required by NFPA 13, “*Standard for the Installation of Sprinkler Systems*,” adopted by reference in section 8.

Chapter 7 Liquefied hydrogen dispensing systems

R 29.7120 System component qualification.

Rule 120. Section 7-1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code is added as follows:

System component qualification. System components shall comply with applicable provisions of Chapters 2 and 3 of this part.

R 29.7121 General system requirements.

Rule 121. Sections 7-2 to 7-2.15 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

7-2 General system requirements.

All fuel dispensing facilities shall meet the provisions of this chapter.

7-2.2 Compression, processing, generation, storage, and dispensing equipment shall be protected to prevent damage from vehicles and minimize the possibilities of physical damage and vandalism and meet the requirements of section 2-1.5 and section 3-4.4.

7-2.2.1 Access to liquefied H<sub>2</sub> storage, compression, and processing equipment by members of the public shall be restricted by a suitable secure area.

7-2.3 Control devices shall be installed so that internal or external icing does not cause vehicle or fueling station malfunction.

7-2.4 Vehicles shall not be considered a source of ignition with respect to the provisions of this chapter.

*Exception: Vehicles containing fuel-fired equipment, such as recreational vehicles and catering trucks, shall be considered a source of ignition unless this equipment is shut off completely before entering an area in which ignition sources are not permitted.*

The fueling connection shall prevent the escape of H<sub>2</sub> where the connector is not properly engaged or becomes separated.

Fueling nozzles for H<sub>2</sub> service shall be in accordance with section 2-14.1.

Compression and processing equipment shall be designed for use with H<sub>2</sub> and for maximum pressures and temperatures to which it can be subjected under normal operating conditions.

Compression and processing equipment shall have pressure relief devices that limit each stage pressure to the maximum allowable working pressure for the compression cylinder and piping associated with that stage of compression and meets the requirements of chapter 2.

H<sub>2</sub> compression equipment shall be equipped with appropriate automatic shutdown controls.

Control circuits that shut down, shall remain down until manually activated or reset by qualified personnel.

A hazard analysis shall be conducted on every H<sub>2</sub> fueling system installation by a qualified engineer(s) with proven expertise in H<sub>2</sub> fueling systems and installations.

The hazard analysis shall include the following: fire protection measures, fire protection and suppression systems, detection systems, and ventilation.

At a minimum, the hazard analysis shall include consideration of potential failures in hoses, nozzles, dispensing equipment, as well as failures for maintenance and service.

7-2.11.3 Method used for hazard analysis shall be 1 or combination of several of the following recognized procedures: hazard and operability studies (HAZOPs), failure mode effects and criticality analysis (FMECA), preliminary hazards analysis (PHA), fault tree analysis (FTA) and event tree analysis (ETA). Other analysis methods, when used, shall ensure same level of system safety as provided by any of the recognized procedures or acceptable to the department based on the best interest of public health, safety, and welfare, and the environment.

Standard designs that have been analyzed by recognized procedure need not be studied each and every time such installation occurs. Site-specific elements that are unique to the installation shall be reviewed in concert with the analysis performed on the standard system to ensure that the standard design has not been altered in a way that would negatively affect the hazard analysis.

These hazard analyses shall be available for review at final inspection, prior to the installation being placed into service, shall be maintained on site, and be available to the department upon request.

Dispensing systems shall be equipped with overfill protection.

Warning signs shall be conspicuously posted in the dispensing area and shall incorporate the following or equivalent wording: "Stop Motor, No Smoking, Non-Odorized Flammable Gas, Cryogenic Liquid or Cold Gas. Remain in attendance outside of the vehicle and in view of the nozzle. No filling of portable containers in or on a motor vehicle."

Each outdoor H<sub>2</sub> -dispensing device shall be located not less than 10 feet (3.1 meters) from property lines, openings to buildings, and buildings of combustible wall construction. A dispensing device shall not be less than 20 feet (6.1 meters) from any activity that involves a fixed source of ignition. In addition, a dispenser shall not be placed beneath a power line.

Each container filling location that is open to the public shall have an attendant or supervisor on duty who meets the requirements of section 1-8 of the rules.

R 29.7122 Operational requirements for full-service liquefied H<sub>2</sub> motor fuel dispensing facilities.

Rule 122. Sections 7-3 to 7-3.2 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Operational requirements for full-service liquefied H<sub>2</sub> motor fuel dispensing facilities.

Each motor fuel dispensing facility shall have an attendant or supervisor on duty whenever the facility is open for business. The attendant or supervisor shall dispense liquefied H<sub>2</sub> into fuel tanks of motor vehicles or into portable containers.

7-3.2 The provisions of section 2-1 of this part shall not prohibit the temporary use of a portable storage container in conjunction with the dispensing of liquefied H<sub>2</sub> into a container of a motor vehicle or other motorized equipment which is on the premises and which is not accessible to the public. A portable storage container installation shall only be made with the approval of the department and comply with all the requirements of section 2-13.

R 29.7123 Operational requirements for attended self-service motor fuel dispensing facilities.

Rule 123. Sections 7-4 to 7-4.5 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Operating requirements for attended self-service motor fuel dispensing facilities.

Self-service motor fuel dispensing facility shall mean that portion of a property where liquefied H<sub>2</sub> used as motor fuel is stored and dispensed from fixed, approved dispensing equipment into the fuel containers of motor vehicles by persons other than the facility attendant and shall also include, where provided, facilities for sale of other retail products.

There shall be not less than 1 attendant on duty while the self-service facility is open for business. The attendant's primary function shall be to supervise, observe, and control the dispensing of liquefied H<sub>2</sub> while the liquefied H<sub>2</sub> is actually being dispensed.

The responsibility of the attendant shall be as follows:

Prevent the dispensing of liquefied H<sub>2</sub> into portable containers in or on a motor vehicle.

Control sources of ignition.

Immediately activate emergency controls and notify the fire department of any fire.

The attendant or supervisor on duty shall be mentally and physically capable of performing the functions and assuming the responsibility prescribed in section 7-4.

Operating instructions shall be conspicuously posted in the dispensing area.

The dispensing area shall at all times be in clear view of the attendant, and the placing or allowing of any obstacle to come between the dispensing area and the attendant control area is prohibited. This may be achieved by cameras or mirrors, or both. The attendant shall at all times be able to communicate with persons in the dispensing area.

R 29.7124 Operational requirements for unattended self-service motor fuel dispensing facilities.

Rule 124. Sections 7-5 to 7-5.5 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Operating requirements for unattended self-service motor fuel dispensing facilities.

Unattended self-service shall be permitted subject to the approval of the department based on the best interests of public health, safety, and welfare and the environment. Users shall use a key, card, or other method which is unique to each user, and which is provided by the facility operator, and shall be properly trained in dispensing operations. The owner shall verify such training to the department upon request.

At least 1 emergency shutoff device specified in section 7-6 shall be provided, and shall be reset only by the owner or an owner's authorized agent.

Operating instructions shall be conspicuously posted in the dispensing area. The instructions shall include the location of emergency controls.

In addition to the warning signs specified in section 6-2, emergency instructions shall be conspicuously posted in the dispenser area. The instructions shall incorporate the following or equivalent wording:

“Emergency Instructions

In Case of Fire:

Use emergency stop button.

Report accident by calling the local fire number. Report location.”

A telephone or other approved, clearly identified means to notify the fire department shall be provided on the site in a location approved by the department.

R 29.7125 Emergency shutoff devices.

Rule 125. Sections 7-6 and 7-6.1 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Emergency shutoff devices.

Liquefied H<sub>2</sub> dispensing systems shall be provided with 1 or more clearly identified emergency shutoff devices or electrical disconnects at the dispensing area. Such devices or disconnects shall be installed in approved locations but not less than 10 feet (3.1 meters) and not more than 100 feet (30.5 meters) away from the dispensing area and which is along the means of egress. Emergency shutoff devices or electrical disconnects shall disconnect power and fuel supply to all dispensing devices, to all remote pumps serving the dispensing devices, and to all associated power. When more than 1 emergency shutoff device or electrical disconnect is provided, all devices shall be interconnected. Resetting an emergency shutoff shall require manual intervention and the manner of resetting shall be approved by the department.

R 29.7126 Refueling from transport vehicles.

Rule 126. Sections 7-7 to 7-7.11 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

Refueling from transport vehicles. The dispensing of liquefied H<sub>2</sub> in the open from a transport vehicle to a motor vehicle located at commercial, industrial, governmental, or manufacturing establishments and intended for fueling vehicles used in connection with their businesses shall be permitted if all of the requirements of sections 7-7.1 to 7-7.11 have been met.

The department shall be notified before commencing operations under section 7-7.

The transport vehicle shall comply with U.S. DOT requirements for the transportation of liquefied H<sub>2</sub>.

Nighttime deliveries shall only be made in an area considered to be adequately lighted.

The transport vehicle flasher lights shall be in operation while dispensing operations are in progress.

Smoking materials, including matches, lighters, and other sources of ignition, including torches, shall not be used within 20 feet (6.1 meters) of the dispensing of liquefied H<sub>2</sub> in the open from a transport vehicle to a motor vehicle.

Each area where dispensing of liquefied H<sub>2</sub> in the open from a transport vehicle to a motor vehicle shall be provided with 1 or more listed fire extinguishers that have a minimum capability of 40-B:C. The fire extinguishers shall be readily accessible to the dispensing operation. Fire extinguishers shall be inspected and maintained under NFPA 10, “*Standard for Portable Fire Extinguishers*,” adopted by reference in section 8.

Mobile fueling shall take place aboveground, shall not be beneath electric power lines or where exposed by their failure, and shall be 10 feet (3.1 meters) from the nearest important building, property lines or combustible storage.

Transport vehicle brakes shall be set and chock blocks shall be in place.

Persons performing dispensing operations shall be qualified to deliver and dispense H<sub>2</sub> fuels. Operations of transport vehicles used for mobile fueling operations shall have access on-site or be in possession of an emergency communications device to notify the proper authorities if there is an emergency.

The transport vehicles shall be positioned with respect to vehicles being fueled to prevent traffic from driving over the delivery hose and between the transport vehicle and motor vehicle being fueled. The dispensing hose shall be properly placed on an approved reel or in an approved compartment before moving the transport vehicle.

The transfer area shall meet the requirements of section 5-4.

## Chapter 8 Referenced publications

### R 29.7127 Referenced publications.

Rule 127. Sections 8-1 to 8-1.2.9 of the storage and handling of liquefied and gaseous H<sub>2</sub> code are added as follows:

The following documents or portions thereof are referenced within this standard as mandatory requirements and shall be considered part of the requirements of this standard. The edition indicated for each referenced mandatory document is the current edition, and cost at time of adoption of these rules. Copies of the adopted publications are available for inspection at the office of the Department of Environmental Quality, Waste and Hazardous Materials Division, Storage Tank Unit, P.O. Box 30241, Lansing, Michigan 48909-7741.

NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, Massachusetts 02269-9101.

NFPA 10, "*Standard for Portable Fire Extinguishers*," 2002 edition, \$36.50.

NFPA 13, "*Standard for the Installation of Sprinkler Systems*," 2002 edition, \$70.00.

NFPA 69, "*Standard on Explosion Prevention Systems*," 2002 edition, \$33.50.

NFPA 70, "*National Electrical Code*," 2005 edition, \$75.00.

NFPA 220, "*Standard on Types of Building Construction*," 1999 edition, \$28.00.

NFPA 704, "*Standard System for the Identification of the Hazards of Materials for Emergency Response*," 2001 edition, \$33.50.

#### Other Publications.

ASME Publications. American Society of Mechanical Engineers, Three Park Avenue, New York, New York 10016-5990.

ANSI/ASME B31.3, "*Process Piping*," 2004 edition, \$240.00.

ASME International, "*Boiler and Pressure Vessel Code*," Section VIII, 2004 edition, \$525.00.

ASTM Publication. American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428-2959.

ASTM E136-04, "*Standard Test Methods for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C*," 2004 edition, \$35.00.

CGA Publications. Compressed Gas Association, 1725 Jefferson Davis Highway, Arlington Virginia 22202-4100.

CGA S-1.1, "*Pressure Relief Device Standards – Part 1 – Cylinders for Compressed Gases*," 2002 edition, \$196.00.

- CGA S-1.2, “*Pressure Relief Device Standards – Part 2 – Cargo and Portable Tanks for Compressed Gases*,” 1995 edition, \$145.00.
- CGA S-1.3, “*Pressure Relief Device Standards – Part 3 – Stationary Storage Containers for Compressed Gases*,” 2003 edition, \$145.00.
- CGA G-5.5, “*Hydrogen Vent Systems*,” 2004 edition, \$39.00.
- ANSI/CGA C-4, “*Method of Marking Portable Compressed Gas Containers to Identify the Material Contained*,” 2003 edition, \$252.00.
- CGA C-7, “*Guide to the Preparation of Precautionary Labeling and Marking of Compressed Gas Containers*,” 2000 edition, \$268.00.
- IAS Publications. International Approval Services, 8501 East Pleasant Valley Road, Cleveland, Ohio 44131.
- ANSI/IAS NGV 4.4, “*Breakaway Devices for Dispensing Systems*,” 1999 edition, \$57.00.
- NACE Publications. National Association of Corrosion Engineers International, 1440 South Creek Drive, Houston, Texas 77084.
- NACE RP0169, “*Control of External Corrosion of Underground or Submerged Metallic Piping Systems*,” 2002 edition, \$42.00.
- NACE RP0285, “*Corrosion Control of Underground Storage Tank Systems by Cathodic Protection*,” 2002 edition, \$37.00.
- 8-1.2.6 International Codes Council. 4051 West Flossmore Road, Country Club Hills, Illinois 60478-5795.
- “*International Fire Code*,” 2006 edition, section 2209.3.2.6, \$61.50.
- 8-1.2.7 U.S. Government Publications. U.S. Government Printing Office, Washington, DC 20402.
- Title 49, *Code of Federal Regulations*, Parts 171-190, U.S. Department of Transportation *Specifications and Regulations*.
- ECS Publications. European Committee for Standardization, Central Secretariat: rue de Stassart 36, B-1050, Brussels.
- EN 1081, “*Resilient Floor Coverings, Determination of the Electrical Resistance*,” 1998 edition, \$32.00.
- API Publications. American Petroleum Institute, 1220 L Street, Northwest, Washington, DC, 20005-54070.
- API Recommended Practice 2003, “*Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents*,” 7<sup>th</sup> edition, \$111.00.

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**NOTICE OF PUBLIC HEARING**

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2006-063  
NOTICE OF PUBLIC HEARING  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
WASTE AND HAZARDOUS MATERIALS DIVISION

The Michigan Department of Environmental Quality (DEQ), Waste and Hazardous Materials Division (WHMD), will conduct public hearings on two different proposed administrative rules packages promulgated pursuant to the Fire Prevention Code, 1941 PA 207 (Act 207); R 29.4001 to R 29.4003, R 29.4021 to R 29.4035, R 29.6001, R 29.6002, and R 29.6036 to R 29.6097; and R 29.7001, R 29.7002, R 29.7010 to R 29.7068, and R 29.7071 to R 29.7127, respectively. The first proposed rules package addresses the storage, handling, and dispensing of liquefied petroleum gas (LPG) and provides for the use of new technology. The second proposed rules package addresses the storage, handling, and dispensing of liquefied and gaseous hydrogen.

The public hearing on the LPG rules will be held on September 18, at 10:00 a.m. The public hearing on the hydrogen rules will be held on September 18, 2007, at 1:00 p.m. Both public hearings will be held in the Con-Con Conference Room, Constitution Hall, Atrium Level South, 525 West Allegan Street, Lansing, Michigan 48933.

Copies of the proposed rules (SOAHR 2006-064EQ and SOAHR 2006-063EQ, respectively) can be downloaded from the Internet through the State Office of Administrative Hearings and Rules at <http://www.michigan.gov/orr>. Copies of the rules may also be obtained by contacting the Lansing office at:

Waste and Hazardous Materials Division  
Michigan Department of Environmental Quality  
P.O. Box 30241  
Lansing, Michigan 48909-7741  
Phone: 517-335-7211  
Fax: 517-335-2245

All interested persons are invited to attend and present their views. It is requested that all statements be submitted in writing for the hearing record. Anyone unable to attend may submit comments in writing to the address above. Written comments must be received by September 25, 2007.

Persons needing accommodations for effective participation in the meeting should contact the WHMD at 517-335-7211 one week in advance to request mobility, visual, hearing, or other assistance.

This notice of public hearing is given in accordance with Sections 41 and 42 of Michigan's Administrative Procedures Act, 1969 PA 306, as amended, being Sections 24.241 and 24.242 of the Michigan Compiled Laws (MCL). Administration of the rules is by authority conferred on the Director of the DEQ by Section 3c of Act 207, being Section 29.3c of the MCL and Executive Order 1998-2. These rules will become effective seven days after filing with the Secretary of State.

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**PROPOSED ADMINISTRATIVE RULES**

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SOAHR 2006-064

DEPARTMENT OF ENVIRONMENTAL QUALITY

WASTE AND HAZARDOUS MATERIALS DIVISION

STORAGE AND HANDLING OF LIQUEFIED PETROLEUM GASES

Filed with the Secretary of State on  
These rules take effect 7 days after filing with the Secretary of State

(By authority conferred on the Michigan Department of Environmental Quality by Section 3c of 1941 PA 207, MCL 29.3c, and Executive Reorganization Order No. 1998-2, MCL 29.461)

Draft August 20, 2007

R 29.6001, R 29.6002, R 29.6036, R 29.6037, R 29.6038, R 29.6039, R 29.6040, R 29.6041, R 29.6042, R 29.6043, R 29.6044, R 29.6045, R 29.6046, R 29.6047, R 29.6048, R 29.6049, R 29.6050, R 29.6051, R 29.6052, R 29.6053, R 29.6054, R 29.6055, R 29.6056, R 29.6057, R 29.6058, R 29.6059, R 29.6060, R 29.6061, R 29.6062, R 29.6063, R 29.6064, R 29.6065, R 29.6066, R 29.6067, R 29.6068, R 29.6069, R 29.6070, R 29.6071, R 29.6072, R 29.6073, R 29.6074, R 29.6075, R 29.6076, R 29.6077, R 29.6078, R 29.6079, R 29.6080, R 29.6081, R 29.6082, R 29.6083, R 29.6084, R 29.6085, R 29.6086, R 29.6087, R 29.6088, R 29.6089, R 29.6090, R 29.6091, R 29.6092, R 29.6093, R 29.6094, R 29.6095, R 29.6096, R 29.6097 of the Michigan Administrative Code are added, and R 29.4001, R 29.4002, R 29.4003, R 29.4021, R 29.4022, R 29.4023, R 29.4024, R 29.4025, R 29.4026, R 29.4027, R 29.4028, R 29.4029, R 29.4030, R 29.4031, R 29.4032, R 29.4033, R 29.4034, and R 29.4035 of the Code are rescinded to read as follows:

**PART 1. GENERAL PROVISIONS**

**R 29.6001 Applicability.**

**Rule 1. These rules apply to the operation of all liquefied petroleum gas (LP-gas) systems. A person shall comply with these rules, other applicable state and federal statutes, and rules and regulations promulgated under the statutes.**

**R 29.6002 Storage and handling of liquefied petroleum gases; adoption of standard by reference. Rule 2. The National Fire Protection Association's (NFPA) pamphlet entitled "NFPA 58 Liquefied Petroleum Gas Code 2004 Edition," pertaining to the storage and handling, but not transportation, of LP-gas, is adopted by reference as part of these rules. Copies of the adopted code are available for inspection and distribution either at the office of the Department of Environmental Quality, Waste and Hazardous Materials Division, Storage Tank Unit, P.O. Box 30241, Lansing, Michigan 48909-7741, or from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269, telephone number 800-344-3555. The cost of the code, at the time of the adoption, is \$41.00, plus a \$7.95 handling charge, per copy.**

**R 29.4001–Applicability. Rescinded.**

~~Rule 1. These rules apply to the operation of all liquefied petroleum gas systems. A person shall comply with these rules, other applicable state and federal statutes, and rules and regulations promulgated under the statutes.~~

**R 29.4002–Storage and handling of liquefied petroleum gases; adoption of standard by reference. Rescinded.**

~~Rule 2. The national fire protection association's publication entitled “NFPA 58 LP Gas Code 1998 Edition,” referred to in these rules as the “code,” pertaining to the storage and handling, but not transportation, of liquefied petroleum gas, is adopted by reference as part of these rules. Copies of the adopted code are available for inspection and distribution either at the office of the Department of Environmental Quality, Waste and Hazardous Materials Division, P.O. Box 30157, Lansing, Michigan 48909-7657, or from The National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269, telephone number 1-800-344-3555. The cost at the time of adoption of these rules is \$29.25, plus a \$4.85 handling charge, per copy.~~

**R 29.4003–Rescission. Rescinded**

~~Rule 3. R 29.3801 and R 29.3819 to R 29.3856 of the Michigan Administrative Code, appearing on pages 33 to 39 of the 1984 Annual Supplement to the 1979 Michigan Administrative Code, pertaining to the storage and handling, but not transportation, of liquefied petroleum gas, are rescinded.~~

**R 29.4021 Notification of installation. Rescinded.**

~~Rule 21. Section 1-4.1 of the code is amended, and Sections 1-4.1.1, 1-4.1.2, 1-4.1.3, 1-4.1.4, 1-4.1.5, 1-4.3, and 1-4.3.1 are added as follows:~~

~~1-4.1. An applicant shall submit an installation application to the department before beginning construction of any new installation, or additional storage capacity to an existing installation, involving any of the following:~~

~~*Installations where individual storage capacity exceeds 2,000 gallons water capacity.*~~

~~*Installations where the aggregate storage capacity exceeds 4,000 gallons water capacity.*~~

~~*A liquefied petroleum gas container filling location.*~~

~~1-4.1.1. The installation application required by Section 1-4.1 of the code shall include all of the following information:~~

~~A plot map showing all of the following:~~

~~The location of all of the following:~~

~~Buildings.~~

~~Public roadways.~~

~~Railroad mainlines.~~

~~Public sidewalks.~~

~~Overhead electric power lines.~~

~~The proposed location of the container.~~

~~The location of adjacent and existing containers.~~

~~The location of existing flammable and combustible aboveground tanks.~~

~~The location of the point of transfer in relation to all of the following:~~

~~The container.~~

~~Buildings.~~

~~Public ways.~~

~~Outdoor places of public assembly.~~

~~Driveways.~~

~~Mainlines railroad track center lines.~~

~~Flammable and class II combustible liquid dispensers.~~

~~Aboveground and underground tanks.~~

~~The lines of adjoining property that are or may be built upon.~~

~~The material of construction.~~

~~The dimension and capacity of each container.~~

~~Container appurtenances.~~

~~A piping diagram showing all of the following:~~

~~Sizes.~~

~~Valves.~~

~~Pressure relief devices.~~

~~Fittings.~~

~~The manufacturer and part number of all components on the liquefied petroleum gas system.~~

~~The department may accept materials and equipment if it is demonstrated to the department's satisfaction that the proposed material or equipment is of an equivalent rating or higher.~~

~~1-4.1.2. Upon acknowledged receipt of the installation application, the department shall issue a plan review report within 21 days. If a plan review report is not issued within 21 days, then an applicant may construct the installation according to the submitted installation application and shall comply with these rules.~~

~~1-4.1.3. An applicant shall notify the department upon completion of the installation before the installation is placed into service. The department shall inspect the installation after receiving notification and shall certify the installation if the requirements of these rules are met. If the inspection is not made within 2 working days, then the applicant may place the installation into service, or if intended to be underground, mounded, or partially underground, may cover the installation from sight. In either case, an applicant shall notify the department and shall submit a notarized affidavit to the department attesting to the fact that the installation complies with the installation application submitted and the applicable rules.~~

~~1-4.1.4. Upon request, the department shall return all installation applications submitted to the department for review after the department has certified the installation or within 30 days from notification of the completion of the installation.~~

~~1-4.1.5. If the construction of the storage system is not commenced within 1 year after the date of the installation application approval, then an applicant shall resubmit an installation application in accordance with this section. An applicant shall submit the fees required under the act with the resubmitted application. This subsection shall also apply to installation applications that were submitted before the effective date of these rules.~~

~~1-4.3. Owners and operators shall register any underground, mounded, or partially underground liquefied petroleum gas storage location having a container that has an individual water capacity of more than 2,000 gallons, where 2 or more containers having an aggregate water capacity of more than 4,000 gallons, or which is a container filling location. Registration shall be on a form provided by the department, and shall be submitted to the department within one year from the effective date of these rules.~~

~~1-4.3.1. A propane gas supplier shall maintain records of the locations where underground, mounded, or partially underground liquefied petroleum gas storage containers other than containers specified in Section 1-4.3. of the code were filled.~~

**R 29.4022 Qualification of personnel. Rescinded.**

~~Rule 22. Section 1-5 of the code is amended, and Sections 1-5.1 and 1-5.2 are added to the code as follows:~~

~~1-5. Qualification of personnel.~~

~~1-5.1. Not later than 2 years after the effective date of these rules or not later than 1 year after the date of employment, a person who transfers liquefied petroleum gas, or whose primary duties fall within the scope of the code, shall complete a training program and then receive certification from the national propane gas association's employee training certification program that includes handling, operating, and certified testing of liquefied petroleum gas, as adopted in Section 12-1.13 of the code. The employer shall document that the person has received certified testing training. Only an individual who has received the certified testing training specified in this code is permitted to install or service liquefied petroleum gas systems and equipment.~~

~~Exception: A person transferring liquefied petroleum gas to a motor vehicle at a dispensing station or an attended self serve facility is not required to comply with this section.~~

~~1-5.2. Within 1 year from the effective date of these rules, a person who transfers liquefied petroleum gas at a dispensing station shall receive training in accordance with the national propane gas association's dispenser operator's training manual. The employer shall document that the person has received training.~~

~~Exception: A person who transfers liquefied petroleum gas at an attended self serve facility is not required to comply with this section. However, an attendant on duty at the facility shall receive certification in compliance with this section.~~

**R 29.4023 Definitions; "glossary of terms"; abbreviations. Rescinded.**

~~Rule 23. Section 1-6 of the code is amended by amending the definitions of "approved," "authority having jurisdiction," and "container filling location" and by adding the definition of "department" as follows:~~

~~1-6. "Approved" means acceptable to the department unless specifically indicated otherwise in these rules.~~

~~"Authority having jurisdiction" means the department under 1941 PA 207, MCL 29.1 et seq., and executive orders 1997 and 1998 cited as Executive Reorganization Order Nos. 1997-2 and 1998-2, MCL 29.451, and MCL 29.461.~~

~~"Cathodic protection tester" means a person who can demonstrate an understanding of the principles and measurements of all common types of cathodic protection systems as applied to buried or submerged metal piping and container assemblies and who has education and experience in soil resistivity, stray current, structure to soil potential, and component electrical isolation measurements of buried metal piping and container assemblies. The person shall be certified by the national association of corrosion engineers international, steel tank institute, or any other organization that is acceptable to the department.~~

~~"Container filling location" means the location where liquefied petroleum gas is transferred from a fixed stationary container into cylinders or containers.~~

~~"Container system" means container assembly and piping system.~~

“Corrosion expert” means a person who, by reason of thorough knowledge of the physical sciences and the principles of engineering and mathematics acquired by a professional education and related to practical experience, is qualified to engage in the practice of corrosion control on buried or submerged metal piping systems and container assemblies. The person shall possess certification as being qualified by the national association of corrosion engineers international as a senior corrosion technologist, a cathodic protection specialist, or a corrosion specialist; or be a registered professional engineer who possesses certification or licensing that includes education and experience in corrosion control of buried or submerged metal piping systems and metal container assemblies.

“Department” means the Department of Environmental Quality.

**R 29.4024 Prohibitions. Rescinded.**

Rule 24. Sections 1 7, 1 7.1, 1 7.2, 1 7.3, and 1 7.4 are added to the code as follows:

**1 7. Prohibitions.**

~~1 7.1. An LP gas system or handling practice that is not in compliance with these rules is in violation of these rules.~~

~~1 7.2. A person shall not deliver liquefied petroleum gas into any container or use a liquefied petroleum gas container if the container is not in compliance with these rules.~~

~~1 7.3. Upon notification by the department, a person shall not deliver liquefied petroleum gas into any container, or use a liquefied petroleum gas container, if the container is not in compliance with these rules. The notification may be a verbal or written communication or an affixed written notification on the liquefied petroleum gas system.~~

~~1 7.4. A person shall not tamper with, remove, or disregard written notification affixed to the liquefied petroleum gas container.~~

**R 29.4025 Container marking. Rescinded.**

Rule 25. Section 2 2.6.4 of the code is amended to read as follows:

~~2 2.6.4. Effective 1 year after the effective date of these rules, owners, and operators shall place a warning label on all cylinders not filled at the site having a liquefied petroleum gas capacity of 100 pounds (45.4 kg) or less. The label shall include information on the potential hazards of liquefied petroleum gas.~~

**R 29.4026 Location of containers. Rescinded.**

Rule 26. Section 3 2.2.9 of the code is amended as follows:

~~3 2.2.9. Persons shall not install structures such as fire walls, fences, earth or concrete barriers, and other similar structures closer than 10 feet (3.1 m) adjacent to, or over, nonrefrigerated containers. All structures installed around containers and container filling locations shall have not less than 6 inches (15.2 cm) of unobstructed clearance from the surface grade or floor to the bottom of the structure. Persons may install structural supports less than 6 inches (15.2 cm) above grade or floor which are designed to maintain adequate ventilation in accordance with Section 7 2.2. Means of egress shall meet the requirements in Section 3 3.6 of the code.~~

~~Exception no. 1: The department shall allow the use of structures that partially enclose containers if the structures are designed in accordance with a sound fire protection analysis. (See Section 3 10.2.3 of the code.)~~

~~Exception no. 2: The department shall allow the use of structures used to prevent flammable or combustible liquid accumulation or flow in accordance with Section 3 2.2.7(c) of the code.~~

~~Exception no. 3: The department shall allow the use of structures between liquefied petroleum gas containers and gaseous hydrogen containers in accordance with Section 3-2.2.7(f) of the code.~~

~~Exception no. 4: The department shall allow the use of fences in accordance with Section 3-3.6 of the code.~~

**R 29.4027 Installation of containers. Rescinded.**

~~Rule 27. Section 3-2.3.1(c) of the code is deleted. Table 3-2.3.3 was amended by adding Part L, Section 3-2.4.1 is amended, and subsection 3-2.4.1(g) is added, Section 3-2.4.8 was amended by adding subsection 3-2.4.8(h) and Section 3-2.4.8.1 is added to the code, as follows:~~

~~Section 3-2.3.1(c) Deleted.~~

~~Table 3-2.3.3 Part L—The minimal horizontal distance between the point of transfer and utility system opening shall be not less than 15 feet.~~

~~3-2.4.1(c) If physical damage from vehicles is a possibility to liquefied petroleum gas containers, or systems of which they are a part, including bulkheads, then owners and operators shall take the following precautions:~~

~~An owner and operator shall install crash posts consisting of concrete filled, schedule 40 steel pipe that is not less than 4 inches (10.2 cm) in diameter. Owners and operators shall install the posts not less than 3 feet (1 m) below grade, 4 feet (1.2 m) above grade, and a maximum of 5 feet (1.5 m), on center, between posts. Owners and operators shall install each post in a concrete base foundation that is not less than 10 inches (25.4 cm) in diameter, and not less than 40 inches (101.6 cm) below grade.~~

~~An owner or operator may use a means of protection equivalent to the protection specified in Section 3-2.4.1(c)(1) of the code if approved by the department.~~

~~3-2.4.1(g) If a permanently installed container is in an area that is subject to buoyant forces, provision shall be made to prevent the container, either full or empty, from floating during a rise in water level, including up to the established maximum flood stage.~~

~~3-2.4.8(h) Buried LPG containers no longer in use for more than 12 months shall be removed from the ground. If building structures exist above or in close proximity to the container such that removal would jeopardize the building structure integrity, then the owner or operator may close the container in place. To close the container in place, the container shall be emptied, cleaned, purged of all vapors, and filled with an inert solid material. Piping permanently removed from service shall be purged and capped, or removed from the ground.~~

~~3-2.4.8.1. An owner and operator shall ensure that container systems are properly designed and constructed in accordance with American society of mechanical engineers and that any portion which is underground, mounded, or partially underground is protected from corrosion as follows:~~

~~The American society of mechanical engineers approved container system is cathodically protected in the following manner:~~

~~The American society of mechanical engineers approved container system is coated with a suitable dielectric material.~~

~~Factory installed or field installed cathodic protection systems are designed by a corrosion expert or in accordance with the national association of corrosion engineers recommended practice RP-02-85-95 entitled “Corrosion Control of Underground Storage Tank Systems by Cathodic Protection,” or equivalent protection.~~

~~Impressed current systems are designed to allow a determination of current operating status as required in Section 3-2.14 of the code.~~

~~Cathodic protection systems are operated and maintained in accordance with the provisions of Section 3-2.14 of the code or according to procedures acceptable to the department.~~

~~The Container is made of nonmetallic construction, such as fiberglass or a composite (steel with fiberglass).~~

~~R 29.4028—Installation of pipe, tubing, pipe and tubing fittings, valves, and hose. **Rescinded.**~~

~~Rule 28. Section 3-2.5 of the code is deleted; Sections 3-2.10.11(e) and (g) of the code are amended as follows:~~

~~3-2.10.11(e) Owners and operators may satisfy the requirements of Section 3-2.10.11(b) and (c) of the code by using concrete or steel bulkheads or an equivalent anchorage installed at a minimum of 10 feet (3.1 m) from each storage container. Owners and operators shall ensure that fixed piping is used between the bulkhead and each storage container, and that the piping is attached to, and passes through, the bulkhead.~~

~~3-2.10.11(g) All new installations shall have at least 1 clearly identified and easily accessible manually operated remote emergency shutoff device. Within 1 year after the effective date of these rules, existing installations shall have at least 1 clearly identified and easily accessible manually operated remote emergency shutoff device. The device shall be located not less than 20 feet (6.1 m) nor more than 100 feet (30.5m) in the path of egress from the emergency shutoff valve.~~

~~R 29.4029 Corrosion Protection. **Rescinded.**~~

~~Rule 29. Section 3-2.14. of the code is amended to read as follows:~~

~~3-2.14. Owners and operators shall ensure that all metallic container systems that are underground, mounded, or partially underground are protected and maintained to minimize corrosion as cited in the national association of corrosion engineers standard RP 01-69 (1996 revision) entitled “Recommended Practice, Control of External Corrosion of Underground or Submerged Metallic Piping Systems” and national association of corrosion engineers recommended practice RP 02085-95 entitled “Corrosion Control of Underground Storage Tank Systems by Cathodic Protection,” or equivalent protection approved by the department. The requirements of this rule do not apply to the copper piping attached to tanks used exclusively for residential heating systems.~~

~~All corrosion protection systems shall be operated and maintained to continuously provide corrosion protection to the metal components of the portion of the American society of mechanical engineers approved container systems that routinely contains liquefied petroleum gas and that is in contact with the ground.~~

~~All container systems equipped with cathodic protection systems shall be inspected for proper operation by a qualified cathodic protection tester. The system shall be tested within 6 months of installation and at least once every 3 years thereafter or according to another reasonable time frame established by the department.~~

~~Container systems equipped with impressed current cathodic protection systems shall be inspected by the owner every 60 days to ensure that the equipment is running properly.~~

~~If container systems are equipped with cathodic protection, then the owner or operator shall maintain records to demonstrate that the cathodic protection is in compliance with the performance standards in this section. The records shall provide both of the following:~~

~~The results of the last 3 inspections required in subsection (c) of this section.~~

~~The results of testing from the last 2 inspections required in subsection (b) of this section.~~

~~Within 6 months following the repair of any cathodically protected container system, the cathodic protection system shall be tested in accordance with subsections (b) and (c) of this section to ensure that it is operating properly.~~

**R 29.4030 Protection against tampering. Rescinded.**

~~Rule 30. Section 3-3.6 of the code is amended as follows:~~

~~3-3.6. Protection against tampering.~~

~~Enclosures shall be surrounded by not less than a 6-foot (1.8 m) high metallic, chain-link, industrial-type fence, unless otherwise adequately protected. There shall be not less than 2 means of egress from the fenced or otherwise enclosed area with egress located at opposite sides of the enclosure. Clearance of not less than 3 feet (1.0 m) shall be provided to allow maintenance and emergency egress. If guard service is provided, it shall be extended to the liquefied petroleum gas installation. Guard personnel shall be properly trained as required in Section 1-5 of the code.~~

~~Exception: Two means of egress are not required if the fence is not less than 50 feet from any side of the tank and piping.~~

**R 29.4031 Vehicle fuel dispenser and dispensing stations. Rescinded.**

~~Rule 31. Section 3-9.3.2 of the code is amended and Section 3-9.3.10 of the code is deleted.~~

~~3-9.3.2. A liquefied petroleum gas installation shall not be within a building, but shall be permitted under a weather shelter or canopy, constructed of non-combustible material properly ventilated in accordance with this code and not more than 50 percent of the perimeter enclosed. A stationary storage container shall not be located under the weather shelter or canopy except where the distance between the top of the storage container and the lowest part of the weather shelter or canopy is not less than 8 feet (2.4 m). The top of any required vent stack shall terminate above the weather shelter or canopy.~~

**R 29.4032 Transfer personnel. Rescinded.**

~~Rule 32. Sections 4-2.1.1 and 4-2.2.1 of the code are amended and Sections 4-2.1.3, 4-2.1.4, and 4-2.2.3.1 are added to the code, as follows:~~

~~4-2.1.1. Qualified personnel who meet the provisions of Section 1-5 of the code shall conduct transfer operations. At least 1 qualified person shall be in attendance, not inside a vehicle, and within 25 feet (7.6 m) of the transfer operation from the time connections are made until the transfer is completed, shutoff valves are closed, and lines are disconnected.~~

~~Exception: A person who is engaged in engine motor fueling or marine container filling, at locations open to the public, is not required to comply with this section.~~

~~4-2.1.3. Each engine motor fueling or marine container filling location open to the public shall have an attendant on duty who meets the requirements of Section 1-5 of the code. (See "Exception" of Section 4-2.1.1 of the code)~~

~~4-2.1.4. A container filling location that is not open to the public does not require an attendant or supervisor. Such private locations may include a card or key-controlled dispensing device. The person performing the transfer shall be capable of performing the functions and shall assume the responsibility as prescribed in Section 1-5 of the code and in accordance with Section 4-4.3 of the code. A qualified person shall post operating instructions for performing the transfer on a legible sign in the immediate vicinity of the point of transfer.~~

~~4-2.2.1. The transfer of liquefied petroleum gas out of or into a stationary container shall only be accomplished with authorization from the stationary container owner, and the transfer shall only be conducted by qualified persons trained in proper handling and operating procedures in accordance with the provisions of Section 1-5 of these rules. The person conducting the transfer of liquefied petroleum gas shall also notify the owner of the container 2 working days before to the transfer.~~

~~4-2.2.3.1. Owners and operators shall post the following legible wording, with letters not less than 3 inches in height and in plain view at a container filling location, not later than 12 months after the effective date of these rules:~~

~~No smoking—no open flame~~

~~Warning: Filling the following types of cylinders is prohibited and violators are subject to civil and criminal penalties:~~

~~Cylinders not approved for liquefied petroleum gas.~~

~~Cylinders more than 12 years old that have not been properly recertified.~~

~~Cylinders which are damaged or burned or which, after visual inspection, appear unsafe.~~

~~Cylinders that are not equipped with a collar or cap to protect the valves while in transit.~~

**R 29.4033 Storage outside of buildings. Rescinded.**

~~Rule 33. Section 5-4.1 of the code is amended as follows:~~

~~5-4.1. Owners and operators shall ensure that containers stored outside of buildings that are designated for use, resale, or cylinder exchange be located not less than 5 feet (1.5 m) from any doorway or opening in a building that is or may be accessible to the public and there are not less than 2 means of egress as defined by National Fire Protection Association 101 entitled “Life Safety Code” which is adopted by reference. For buildings, or in areas of buildings, that have only 1 means of egress, owners and operators shall ensure that the location of container storage is not less than 10 feet (3m) from a doorway or opening, nor less than 20 feet (6.1m) from any automotive service station fuel dispensers, and is in accordance with table 5-4.1 of the code with respect to all of the following:~~

~~The nearest important building or group of buildings.~~

~~The line of adjoining property that can be built upon.~~

~~Busy thoroughfares or sidewalks.~~

~~The line of adjoining property occupied by schools, churches, hospitals, athletic fields, or other points of public gathering.~~

~~A dispensing station.~~

~~Exception: The location of cylinders in the filling process is not considered to be in storage.~~

**R 29.4034 General purpose vehicle engines. Rescinded.**

~~Rule 34. Section 8-2.1.1 is added to the code to read as follows:~~

~~8-2.1.1. General purpose vehicle engines fueled by liquefied petroleum gas. Vehicles complying with the federal motor vehicle safety standards covering the installation of liquefied petroleum gas fuel systems on vehicles and certified by the vehicle manufacturer as meeting the standards need not comply with chapter 8 of the codes except for Section 8-2.10 of the code.~~

**R 29.4035 Referenced Publications. Rescinded.**

~~Rule 35. Sections 12-1.12, 12-1.13, and 12-1.14 are added to the code to read as follows:~~

~~12-1.12.(1) National association of corrosion engineers recommended practice RP-01-69 (1996 revision.) entitled “Recommended Practice, Control of External Corrosion of Underground or Submerged Metallic Piping Systems,” is adopted by reference in these rules. The standard is available from the National Association of Corrosion Engineers International, P.O. Box 218340, Houston, TX 77218, at a cost as of the time of adoption of these rules of \$30.00, or from the Department of Environmental Quality, Storage Tank Division, P.O. Box 30157, Lansing, Michigan 48909-7657, at a cost as of the time of adoption of these rules of \$30.00.~~

~~(2) National Association of Corrosion Engineers recommended practice RP 02-85-95 entitled “Corrosion Control of Underground Storage Tank Systems by Cathodic Protection” of the National Association of Corrosion Engineers International, is adopted by reference in these rules and is available as specified in subsection (1) of this section at a cost as of the time of adoption of these rules of \$26.00. 12-1.13. The following national propane gas association, certified employee training programs are adopted in these rules by reference and are available from the National Propane Gas Association, 1600 Eisenhower Lane, Suite 100, Lisle, IL, 60532, phone 630-515-0600, at a cost of the time of adoption of these rules of \$294.00:~~

~~Basic principles and practices, copyright 1999.~~

~~Propane delivery, copyright 1999.~~

~~Distribution systems operations, copyright 1998.~~

~~Plant operations, copyright 1999.~~

~~Transfer system operations, copyright 1998.~~

~~Appliance installation, copyright 1999.~~

~~Appliance service, copyright 1998.~~

~~12-1.14. National Fire Protection Association pamphlet 101 entitled “Life Safety Code” is adopted by reference in the rules. The code is available from the National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269, phone 1-800-344-3555, at a cost as of the time of adoption of these rules of \$48.50, or from the Department of Environmental Quality, Storage Tank Division, P.O. Box 30157, Lansing, Michigan 48909-7657, at a cost of the time of adoption of these rules of \$48.50.~~

## PART 2. AMENDMENTS TO ADOPTED CODE

### **R 29.6036 Nonapplication of code.**

**Rule 36. Section 1.3.2 of the code is amended as follows:**

**1.3.2 Nonapplication of code. This code shall not apply to the following:**

- (a) Frozen ground containers and underground storage in caverns including associated piping and appurtenances used for the storage of LP-gas.**
- (b) Deleted.**
- (c) LP-gas (including refrigerated storage) at utility gas plants (see NFPA 59, *Utility LP-Gas Plant Code*.)**
- (d) Deleted.**
- (e) LP-gas used with oxygen.**
- (f) The portions of LP-gas systems covered by NFPA 54 (ANSI Z223.1), “*National Fuel Gas Code*,” where NFPA 54 (ANSI Z223.1) is adopted, used, or enforced.**
- (g) Transportation by air, including use in hot air balloons, or water under the jurisdiction of the United States Department of Transportation (DOT).**
- (h) Marine fire protection.**
- (i) Refrigeration cycle equipment and LP-gas used as a refrigerant in a closed cycle.**
- (j) The manufacturing requirements for recreational vehicle LP-gas systems that are addressed by NFPA 1192, “*Standard on Recreational Vehicles*.”**
- (k) Propane dispensers located at multiple fuel refueling stations shall comply with NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*.**

### **R 29.6037 Prohibitions.**

**Rule 37. Sections 1.8, 1.8.1, 1.8.2, 1.8.3 of the code are added as follows:**

**1.8 Prohibitions.** Any LP-gas storage container system or practice that is not in compliance with these rules shall be considered to be in violation of these rules.

Upon notification by the department, a person shall not deliver LP-gas to a storage container system under any circumstances that are prohibited by these rules or if a container is not in compliance with these rules. Such notification may include a verbal, written communication, or an affixed written notification on the LP-gas system.

A person shall not tamper with, remove, or disregard a written notification affixed to a storage container system.

An owner or operator shall not continue to use a storage container system that is causing a release and shall expeditiously empty, per chapter 7, the system or the component that is causing the release per applicable sections of chapter 7, until the system is repaired or replaced.

**R 29.6038 Notification of installation.**

**Rule 38. Sections 1.9, 1.9.1, 1.9.1.1, 1.9.1.2, 1.9.1.3, 1.9.1.4, 1.9.1.5, 1.9.1.6, 1.9.2, 1.9.2.1 of the code are added as follows:**

**1.9 Notification of Installation.**

**1.9.1** An applicant shall submit an installation application to the department before beginning construction of any new installation, or additional storage capacity to an existing installation, involving any of the following:

- (a) Installations where individual storage capacity exceeds 2,000 gallons (7.6 cubic meters) water capacity.
- (b) Installations where the aggregate storage capacity exceeds 4,000 gallons (15.2 cubic meters) water capacity.
- (c) A LP-gas container filling location.

The installation application required by section 1.9.1 of the LP-gas code shall include all of the following information:

A plot map showing all of the following:

- (i) The location of all of the following:

Buildings.

Public roadways.

Railroad mainlines.

Public sidewalks.

Overhead electric power lines.

The proposed location of the container.

The location of adjacent and existing containers.

The location of existing flammable and combustible liquid (FL/CL) aboveground storage tanks (ASTs).

The location of the point of transfer in relation to all of the following:

- (A) The container.

- (B) Buildings.

- (C) Public ways.

Outdoor places of public assembly.

Driveways.

Mainline railroad track centerlines.

FL/CL dispensers.

**ASTs and underground storage tanks (USTs).**

**The lines of adjoining property that is or may be built upon.**

**Drains and utility openings.**

**The material of construction.**

**The dimension and capacity of each container.**

**Container appurtenances.**

**A piping diagram showing all of the following:**

**Sizes.**

**Valves.**

**Pressure relief devices.**

**Fittings.**

**The manufacturer and part number of all components on LP-gas system.**

**The department may accept materials and equipment if it is demonstrated to the department's satisfaction that the proposed material or equipment is of an equivalent rating or higher.**

**Upon acknowledged receipt of the installation application the department shall issue a plan review report within 30 days. If a plan review report is not issued within 30 days, then the applicant may construct the installation according to the submitted installation application and shall comply with these rules.**

**The applicant shall notify the department after the plan review is approved to schedule a preliminary inspection prior to site construction. If the preliminary inspection is not made within 2 working days then the applicant may commence construction.**

**An applicant shall notify the department upon completion of the installation before the installation is placed into service. The department shall inspect the installation after receiving notification and shall certify the installation if the requirements of these rules are met. If the inspection is not made within 2 working days, then the applicant may place the installation into service, or if intended to be underground, mounded, or partially underground, may cover the installation from sight. In either case, an applicant shall notify the department and shall submit a signed affidavit to the department attesting to the fact that the installation complies with the installation application submitted and the applicable rules.**

**1.9.1.5 Upon request, the department shall return all installation applications submitted to the department for review after the department has certified the installation or within 30 days from notification of the completion of the installation.**

**1.9.1.6 If the construction of the storage system is not commenced within 1 year after the date of the installation application approval, then the applicant shall resubmit an installation application in accordance with this section. An applicant shall submit the fees required under the act with the resubmitted application.**

**Owners and operators shall register any underground, mounded, or partially underground LP-gas storage location having a container that has an individual water capacity of more than 2,000 gallons, where 2 or more containers having an aggregate capacity of more than 4,000 gallons, or which is a container filling location. Registration shall be on a form provided by the department. A propane gas supplier shall maintain records of the locations where underground, mounded, or partially underground LP-gas storage containers other than containers specified in section 1.9.3 of the rules were filled.**

**R 29.6039 Referenced publications.**

**Rule 39. Section 2.3.10 of the code is added as follows:**

**2.3.10 NACE International Publications.** National association of corrosion engineers international, P.O. Box 218340, Houston, Texas 77218.

**NACE RP0285, *Corrosion Control of Underground Storage Tank Systems by Cathodic Protection*, 2002 edition, \$37.00.**

**NACE RP0169, *Control of External Corrosion of Underground or Submerged Metallic Piping Systems*, 2002 edition, \$42.00.**

**R 29.6040 Official definitions.**

**Rule 40.** Sections 3.2.1, 3.2.2, 3.2.3, 3.2.4, 3.2.5 of the code are amended, and sections 3.2.3(a) and 3.2.3(b) of the code are added as follows:

**3.2.1 “Approved”** means acceptable to the department.

**3.2.2 “Authority having jurisdiction”** means the department.

**3.2.3 “Code”** means the storage and handling of liquefied petroleum gases.

**3.2.3(a) “Department”** means the department of environmental quality.

**3.2.3(b) “Director”** means the director of the department.

**3.2.4 “Labeled”** means equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the department and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with accepted or approved standards of construction and or performance.

**3.2.5 “Listed”** means equipment, materials, or services included in a list published by an organization that is acceptable to the department and concerned with evaluation of products or services, that maintains periodic inspection of production listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

**R 29.6041 General definitions.**

**Rule 41.** Sections 3.3.1(a), 3.3.11(a), 3.3.11(b), 3.3.16(a), 3.3.16(b), 3.3.16(c), 3.3.16(d), 3.3.47(a) and 3.3.69(a) of the code are added as follows:

**3.3.1(a) “Aggregate”** means total capacity of LP-gas containers that are manifolded or grouped together and includes all LP-gas containers that are located within 50 feet (15 meters) of each other.

*Exception: Cylinders waiting use, resale, or exchange when stored in accordance with chapter 8.*

**3.3.11(a) “Cathodic protection”** means a technique to prevent the corrosion of a metal surface by making the surface the cathode of an electrochemical cell. This protection renders a metallic container or piping component negatively charged with respect to its environment. This protection shall be designed by a corrosion expert as defined by these rules.

**3.3.11(b) “Cathodic protection tester”** means a person who can demonstrate an understanding of the principles and measurements of all common types of cathodic protection systems applicable to metal piping and container systems and who has education and experience in soil resistivity, stray current, structure-to-soil potential, and component electrical isolation measurements of metal piping and container systems. The person shall be certified as being qualified by the national association of corrosion engineers (NACE) international.

**3.3.16(a) “Container filling location”** means the location where LP-gas is transferred from a fixed stationary container into cylinders or containers.

**3.3.16(b) “Container system” means the container assembly and piping system.**

**3.3.16(c) “Corrosion expert” means a person who, by reason of thorough knowledge of the physical sciences and the principals of engineering and mathematics acquired by a professional education and related practical experience, is qualified to engage in the practice of corrosion control of container systems. The person shall be certificated as being qualified by NACE, as a senior corrosion technologist, a cathodic protection specialist, or a corrosion specialist or be a registered engineer who has certification and licensing that includes education and experience in corrosion control.**

**3.3.16(d) “Corrosion protection” means protecting a container system to prevent the degradation of the metal through oxidation or reactivity with its environment.**

**3.3.47(a) “NACE” means the national association of corrosion engineers, international.**

**3.3.69(a) “Temporary installation” means an installation of an LP-gas container, piping, and equipment for a definite period of time that is non-reoccurring and non-seasonal use.**

**R 29.6042 Notification of installations.**

**Rule 42. Sections 4.3, 4.3.1, and 4.3.2 of the code are amended as follows:**

**4.3 Notification of installations.**

**4.3.1 Stationary installations. Plans for stationary installations must meet the requirements of section 1.9.**

**4.3.2 Temporary installations. The department shall be notified of temporary, not to exceed 12 months, installations for container sizes covered in section 1.9. All temporary installations shall meet the following:**

**(a) Approval by the department shall be required prior to bringing the container to the site. In reviewing a proposed installation, the condition of the container, the site where the container will be located, installation and testing procedures, and operational procedures shall be evaluated before approval.**

**(b) The approval shall include a definite time limit after which the container shall be removed from the site.**

**(c) The container shall comply with all applicable provisions of this code.**

**R 29.6043 Notification of installations.**

**Rule 43. Section 4.4 of the code is amended, and sections 4.4.1 and 4.4.2 of the code are added as follows:**

**Qualification of personnel.**

**Not later than 1 year after the date of employment, a person who transfers LP-gas, or whose primary duties fall within the scope of this code, shall complete a training program and then receive certification from the national propane association’s employee training certification program that includes handling, operating, and certified testing of LP-gas. The employer shall document that the person has received certified testing training. Only an individual who has received the certified testing training specified in this code is permitted to install or service LP-gas systems and equipment.**

**A person who transfers LP-gas at the dispensing station shall receive training in accordance with the national propane gas association’s dispenser operator’s training manual. The employer shall document the person received the training.**

**R 29.6044 Containers.**

**Rule 44. Subsections 5.2.1.1(c) and 5.2.1.2(d) of the code are added as follows:**

**5.2.1.1(c) Composite cylinders shall be listed.**

**5.2.1.2(d) DOT 4E specification aluminum cylinders and composite cylinders involved in a fire and the cylinders show evidence of fire damage then the cylinders shall be permanently removed from service.**

**R 29.6045 Container maximum operating working pressure.**

**Rule 45. Section 5.2.4.5 of the code is amended as follows:**

**5.2.4.5 Cylinders shall be designed and constructed for at least a 240 psig (1.6 MPag) maximum allowable working pressure.**

**R 29.6046 Containers with attached supports.**

**Rule 46. Section 5.2.7.2 of the code is amended as follows:**

**Any ASME container over 4,000 gallons (15.2 cubic meters) water capacity or any container at a dispensing site as defined in section 3.3.21 shall be equipped in accordance with sections 5.2.7.2(a) to 5.2.7.2(d) and table 5.7.7.3.**

**Steel legs or supports shall be either welded to the container by the manufacturer at the time of fabrication or attached to lugs that have been welded to the container.**

**The legs or supports or the lugs for the attachment of legs or supports shall be secured to the container in accordance with the code or rule under which the container was designed and built, using a minimum safety factor of 4, to withstand loading in any direction equal to twice the weight of the empty container.**

**The attachment of a container to either a trailer or semitrailer running gear, or the attachments to the unit can be moved by a conventional over-the-road tractor, shall comply with the DOT requirements for cargo tank service. The stress calculations for the design of the attachment shall be based on twice the weight of the empty container.**

**The unit shall be approved by the authority having jurisdiction.**

**R 29.6047 Container marking.**

**Rule 47. Subsection 5.2.8.1(c) of the code is added as follows:**

**5.2.8.1(c) Where the data plate is missing on an installation of an ASME LP-gas container over 4,000 gallons (15.2 cubic meters) water capacity, in use at a particular location. The department shall allow prior department LP-gas inspection reports/facility information sheets to be adequate proof, subject to approval by the department. Subject to approval by the department, the department shall agree to allow owners and operators to stamp, using non-sparking tools, within 12 inches (30.4 centimeters) of the center of the head, to stamp into the container all available pertinent information including: serial number, gallon water capacity, manufacturer, or a number issued by the department.**

**R 29.6048 LP-gas hose.**

**Rule 48. Sections 5.3 and 5.3.1 of the code are added as follows:**

**5.3 LP-gas hose.**

**5.3.1 The inner tube of any LP-gas hose shall be compatible with LP-gas.**

**R 29.6049 Pressure relief devices.**

**Rule 49. Section 5.7.2.3 and subsection 5.7.2.4(A) of the code are amended as follows:**

**5.7.2.3 DOT nonrefillable metal containers shall be equipped with a pressure relief device(s) or systems(s) that will prevent propulsion of the container when the container is exposed to fire. Composite cylinders shall not be equipped with fusible plugs.**

**5.7.2.4(a) The start-to-leak setting of such pressure relief valves, in relation to the maximum allowable operating pressure of the container, shall be in accordance with table 5.7.2.4(a).**

**R 29.6050 Container connections and appurtenances.**

**Rule 50. Section 5.7.7.2, subsection 5.7.7.2(c), and section 5.7.7.4 of the code are amended as follows:**

**5.7.7.2 Any ASME container used for motor vehicle fueling and ASME containers over 4,000 gallons (15.2 cubic meters) water capacity shall be equipped in accordance with sections 5.7.7.2(A) to 5.7.7.2(G) and table 5.7.7.3.**

**5.7.7.2 (C) Liquid withdrawal openings in existing installations where the container is equipped with an internal valve or internal excess flow valve that is not fitted for remote closure and automatic shutoff using thermal (fire) actuation shall be equipped for remote and thermal closure.**

**5.7.7.4 ASME containers over 4,000 gallons (15.2 cubic meters) water capacity shall also be equipped with the following appurtenances:**

**(a) An internal spring-type, flush type full internal, or external pressure relief valve, and within 10 years of the date of installation, or within 3 years of the effective date of these rules and every 10 years thereafter, owners and operators of ASME containers shall complete a visual relief valve inspection for containers over 4,000 gallons (15.2 cubic meters) water capacity and any container filling site. These visual relief valve inspections shall include a thorough inspection including removal of stacks to remove all foreign matter from in and around the relief valve. If the valve appears to be damaged or deteriorated, then the relief valve shall be replaced or recertified. Documentation of the inspection shall be provided to the department during required inspections.**

**(b) A fixed maximum liquid level gauge.**

**(c) A float gauge, rotary gauge, slip tube gauge, or a combination of these gauges.**

**(d) A pressure gauge.**

**(e) A temperature gauge.**

**R 29.6051 Container appurtenances protection.**

**Rule 51. Section 5.7.11.5 of the code is amended as follows:**

**Container inlet and outlet connections on ASME containers of more than 2,000 gallons (7.6 cubic meters) water capacity or any dispensing sites as defined in section 3.3.2.1 shall be labeled to designate whether they communicate with the vapor or liquid space.**

**R 29.6052 Piping (including hose), fittings, and valves.**

**Rule 52. Sections 5.8.1.5 and 5.8.1.6 of the code are added as follows:**

**All piping shall be labeled to designate whether they communicate with the vapor or liquid space. All steel or wrought iron piping shall be painted or protected against corrosion by other means acceptable to the department.**

**R 29.6053 Hose, quick connectors, hose connections, and flexible connectors.**

**Rule 53. Section 5.8.6.1 of the code is amended as follows:**

**Hose, hose connections, and flexible connectors shall be fabricated of materials that are compatible with LP-gas both as liquid and vapor.**

**R 29.6054 Valves other than container valves.**

**Rule 54.** Section 5.10.6 of the code is amended as follows:

Valves in polyethylene piping systems shall be manufactured from thermoplastic materials listed in ASTM D 2513 “*Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing and Fittings*” that have been fabricated from materials compatible with LP-gas and comply with ASTM D 2513. Valves in polyamide piping systems shall be manufactured from polyamide material as defined in ASTM D 2513. Metallic valves in polyethylene and polyamide piping systems shall be protected to minimize corrosion in accordance with 6.14.

**R 29.6055 Equipment.**

**Rule 55.** Section 5.15.5.2 of the code is amended, and section 5.15.5.3 of the Code is added as follows:

**5.15.5.2** Vapor meters of the die cast or iron cast type shall be permitted to be used at any pressure equal to or less than the maximum allowable working pressure for which they are designed and marked.

Liquid meters shall be installed so that the meter housing is not subject to excessive strain from the connecting piping. If not provided in the piping design, flexible connectors that do not exceed 36 inches (1 meter) in overall length may be used.

**R 29.6056 Other container location requirements.**

**Rule 56.** Sections 6.4.1, 6.4.5.3, 6.4.5.10, 6.4.7 of the code are amended as follows:

Where storage containers having an aggregate water capacity of more than 4,000-gallons (15.1 cubic meters) are located in heavily populated or congested areas, the siting provisions of section 6.3.1 and table 6.3.1 may be modified as indicated by the fire safety analysis review described in section 6.23.3.

The area under containers shall be graded or shall have curbs installed so that the flow or accumulation of flammable liquids with flash points below 200 degrees Fahrenheit, 93.4 degrees Celsius, is prevented.

**6.4.5.10** The minimum separation between LP-gas containers and liquefied hydrogen containers shall be in accordance with R 29.7001 et seq.

Persons shall not install structures such as fire walls, fences, earth or concrete barriers, and other similar structures closer than 10 feet (3.1 meters) adjacent to, or over nonrefrigerated containers. All structures installed around containers and container filling locations shall have not less than 6 inches (15.2 centimeters) of unobstructed clearance from the surface grade or floor to the bottom of the structure. Persons may install structural supports less than 6 inches (15.2 centimeters) above grade or floor which are designed to maintain adequate ventilation in accordance with section 10.2.2. Means of egress shall meet the requirements in section 6.16.5 of this code.

Structures shall not be permitted around or over installed nonrefrigerated containers unless specifically allowed as follows:

Structures partially enclosing containers shall be permitted if designed in accordance with a sound fire protection analysis.

Structures used to prevent flammable or combustible liquid accumulation or flow shall be permitted in accordance with section 6.4.5.3.

Structures between LP-gas containers and gaseous hydrogen containers shall be permitted in accordance with section 6.4.5.9.

Structures such as fences shall be permitted in accordance with section 6.16.5.

**R 29.6057 Location of transfer operations.**

**Rule 57.** Section 6.5.1.3 of the code is deleted, and table 6.5.3 of the code is amended by adding part L, as follows:

Deleted.

**Table 6.5.3 Add (L) – The minimal horizontal distance between the point of transfer and utility system openings shall be not less than 15 feet (5 meters).**

**R 29.6058 Installation of containers.**

**Rule 58.** Section 6.6.1.7 of the code is added as follows:

**6.6.1.7** Guard posts or other approved means shall be provided to protect a container system subject to vehicular damage. When guard posts are installed, all of the following design specifications shall be met:

- (a) Guard posts shall be constructed of schedule 40 steel pipe not less than 4 inches (10 centimeters) in diameter and shall be filled with concrete.
- (b) Guard posts shall be spaced not more than 5 feet (1.6 meters) on center.
- (c) Guard posts shall be set not less than 3 feet (1 meter) deep in a concrete footing that is not less than 10 inches (25 centimeters) in diameter and not less than 40 inches (1.1 meter) below grade.
- (d) Guard posts shall be not less than 4 feet (1.3 meters) in height above grade.
- (e) Other means as approved by the department based on the best interests of public health, safety, and welfare and the environment.

**R 29.6059 Installation of underground and mounded containers.**

**Rule 59.** Section 6.6.6.1 of the code is amended, subsection 6.6.6.1(G) of the code is amended, subsection 6.6.6.1(M) of the code is added, and section 6.6.6.4 is added, as follows:

**6.6.6.1** ASME container assemblies listed for underground installation, including interchangeable aboveground-underground container assemblies, shall be installed underground in accordance with 6.6.6.1(A) to 6.6.6.1(M).

**6.6.6.1(G)** Buried LP-gas containers no longer in service for more than 12 months shall be removed from the ground. If building structures exist above or in close proximity to the container such that removal would jeopardize the building structure integrity, then the owner or operator may close the container in place. To close the container in place, the container shall be emptied, cleaned, purged of all vapors, and filled with an inert solid material. Where a container is to be abandoned underground the following shall be followed:

- (a) As much liquid LP-gas as practical shall be removed through the container liquid withdrawal connection.
- (b) As much of the remaining LP-gas vapor as practical shall be removed through a vapor connection.
- (c) The vapor shall either be recovered, burned, or vented to the atmosphere.
- (d) If purged, the displaced vapor shall be either recovered, burned, or vented to the atmosphere.

**6.6.6.1(M)** Piping permanently removed from service shall be purged and capped, or removed from the ground.

**An owner and operator shall ensure that container systems are properly designed and constructed in accordance with ASME and that any portion which is underground, mounded, or partially underground is protected from corrosion as follows:**

**The ASME approved container system is cathodically protected in the following manner:**

**The American society of mechanical engineers approved container system is coated with a suitable dielectric material.**

**Factory-installed or field-installed cathodic protection systems are designed by a corrosion expert in accordance with the NACE recommended practice RP0285 entitled “*Corrosion Control of Underground Storage Tank Systems by Cathodic Protection*,” or equivalent protection.**

**Impressed current systems are designed to allow a determination of current operating status as required in section 6.14 of this code.**

**Cathodic protection systems are operated and maintained in accordance with the provisions of section 6.25 of this code or according to procedures acceptable to the department.**

**The container is made of nonmetallic construction such as fiberglass or a composite (steel with fiberglass).**

**R 29.6060 Installation of containers on roofs of buildings.**

**Rule 60. Section 6.6.7 of the code is deleted in its entirety.**

**6.6.7 Deleted.**

**6.6.7.1 Deleted.**

**6.6.7.2 Deleted.**

**R 29.6061 Piping system service limitations.**

**Rule 61. Subsection 6.8.1.1(2) of the code is amended as follows:**

**6.8.1.1(2) Outdoor LP-gas liquid or vapor polyamide piping systems shall have pressure limitations as defined by the maximum allowable working pressure of the piping being installed.**

**R 29.6062 Installation of metallic pipe, tubing, and fittings.**

**Rule 62. Section 6.8.3.3 and subsection 6.8.3.5(2) of the code are amended as follows:**

**Metallic piping shall comply with the following:**

**Piping used at pressures higher than the container pressure, such as on the discharge side of liquid transfer pumps, shall be designed for a maximum allowable working pressure of at least 350 psig (2.4 MPag).**

**Vapor LP-gas piping with operating pressures in excess of 125 psig (0.9 MPag) and liquid piping not covered by section 6.8.3.3(1) shall be designed for a maximum allowable working pressure of at least 250 psig (1.7 MPag).**

**Vapor LP-gas piping subject to pressures of not more than 125 psig (0.9 MPag) shall be designed for a maximum allowable working pressure of at least 125 psig (0.9 MPag).**

**6.8.3.5(2) Fittings and flanges shall be designed for a maximum allowable working pressure equal to or greater than the required maximum allowable working pressure of the service for which they are used.**

**R 29.6063 Valves in polyamide and polyethylene piping systems.**

**Rule 63. Section 6.8.5.3 of the code is amended as follows:**

**Valves shall be manufactured from thermoplastic materials fabricated from materials listed in ASTM D 2513, “*Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings*,”**

that have been fabricated from materials compatible with LP-gas, or from metals protected to minimize corrosion in accordance with section 6.14.

**R 29.6064 Emergency shutoff valves.**

**Rule 64.** Section 6.10.8.1 of the code is added as follows:

Owners and operators may satisfy the requirements of sections 6.10.6 and 6.10.7 of this code by using concrete or steel bulkheads or an equivalent anchorage installed at a minimum of 10 feet (3.1 m) from each storage container. Owners and operators shall ensure that fixed piping is used between the bulkhead and each storage container, and that the piping is attached to, and passes through, the bulkhead.

**R 29.6065 Corrosion protection.**

**Rule 65.** Section 6.14.1 of the code is amended as follows:

Owners and operators shall ensure that all metallic container systems that are underground, mounded, or partially underground are protected and maintained to minimize corrosion as cited in the NACE standard RP0169 entitled “*Recommended Practice, Control of External Corrosion of Underground or Submerged Metallic Piping Systems*,” and NACE recommended practice RP0285 entitled “*Corrosion Control of Underground Storage Tank Systems by Cathodic Protection*,” or equivalent protection approved by the department. The requirements of this rule do not apply to the copper piping attached to tanks used exclusively for residential heating systems.

All corrosion protection systems shall be operated and maintained to continuously provide corrosion protection to the metal components of the portion of the ASME approved container systems that routinely contains LP-gas and that is in contact with the ground.

All container systems equipped with cathodic protection systems shall be inspected for proper operation by a qualified cathodic protection tester. The system shall be tested within 6 months of installation and at least once every 3 years thereafter or according to another reasonable time frame established by the department.

Container systems equipped with impressed current cathodic protection systems shall be inspected by the owner every 60 days to ensure that the equipment is running properly.

If container systems are equipped with cathodic protection, then the owner or operator shall maintain records to demonstrate that the cathodic protection is in compliance with the performance standards in this section. The records shall provide both of the following:

The results of the last 3 inspections required in subsection (c) of this section.

The results of testing from the last 2 inspections required in subsection (b) of this section.

Within 6 months following the repair of any cathodically protected container system, the cathodic protection system shall be tested in accordance with subsections (b) and (c) of this section to ensure that it is operating properly.

**R 29.6066 Pump installation.**

**Rule 66.** Subsection 6.15.2.3(B)(2) of the code is amended as follows:

**6.15.2.3(B)(2)** Operate at a pressure 50 psig (345 kPag) above the operating pressure where the maximum allowable working pressure exceeds 350 psig (2.4 MPag).

**R 29.6067 Security and protection against tampering for section 6.16 and section 6.22 systems.**

**Rule 67.** Subsections 6.16.5.2(A) and 6.16.5.2(E) of the code are amended, and section 6.16.5.3 of the code is deleted, as follows:

**6.16.5.2(A)** There shall be at least 2 means of emergency egress from the enclosure located at opposite sides of the enclosure unless any of the following is met:

The fenced or otherwise enclosed area is not over 100 square feet (9 square meters).

The point of transfer is within 3 feet (1 meter) of the gate.

Containers are not filled within the enclosure.

*Exception: Two means of emergency egress is not required if the fencing is not less than 50 feet from any side of the container or piping.*

**6.16.5.2(E)** Fencing shall not be required where devices that can be locked in place are provided that prevents unauthorized operation of valves, equipment, and appurtenances. Only valves, equipment, and appurtenances that could release product need be locked.

Deleted.

**R 29.6068** Additional equipment requirements for cylinders, equipment, piping, and appliances used in buildings, building roofs, and exterior balconies.

Rule 68. Subsection 6.17.2.6(1) of the code is amended as follows:

**6.17.2.6(1)** Hose used at pressures above 5 psig (34 kPag) shall be designed for a maximum allowable working pressure of at least 350 psig (2.4 MPag).

**R 29.6069** Cylinders on roofs or exterior balconies.

Rule 69. Section 6.17.11 of the code is deleted in its entirety as follows:

**6.17.11** Deleted.

**R 29.6070** Container installation requirements.

Rule 70. Subsection 6.21.3.1(B) of the code is amended as follows:

**6.21.3.1(B)** Cylinders installed on recreational vehicles or on other vehicles shall be constructed for at least a 240 psig (1.6 MPag) maximum allowable working pressure.

**R 29.6071** Vehicle fuel dispenser and dispensing stations. General installation provisions.

Rule 71. Section 6.22.3.3 of the code is amended as follows:

A LP-gas installation shall be permitted under a weather shelter or canopy, constructed of non-combustible material, properly ventilated in accordance with this code and not more than 50% of the perimeter enclosed. A stationary storage container shall not be located under the weather shelter or canopy except where the distance between the top of the storage container and the lowest part of the weather shelter or canopy is not less than 8 feet (2.4 meters). The top of any required vent stack shall terminate above the weather shelter or canopy.

**R 29.6072** Protection of ASME containers.

Rule 72. Sections 6.23.3.1, 6.23.3.2, and 6.23.3.7 of the code are amended, and section 6.23.3.3 of the code is deleted, as follows:

Fire protection shall be provided for installations with an aggregate water capacity of more than 4,000 gallons (15.1 cubic meters).

The modes of fire protection shall be specified in a written product release prevention and fire safety analysis.

Deleted.

If in the preparation of the fire safety analysis it is determined that a hazard to adjacent structures exists that exceed the protection provided by the provisions of this code, special protection shall be provided in accordance with section 6.23.5.

**R 29.6073 Spacing requirements.**

**Rule 73.** Section 6.24.2.3 of the code is amended as follows:

No part of a mounded or an underground ASME container shall be less than 10 feet (3 m) from a building or line of adjoining property that can be built upon.

**R 29.6074 Transfer personnel.**

**Rule 74.** Section 7.2.1.4 of the code is added as follows:

A container filling location that is not open to the public does not require an attendant or supervisor. Such private locations may include a card or key-controlled dispensing device. The person performing the transfer shall be capable of performing the functions and shall assume the responsibility as prescribed in section 4.4 of this code and in accordance with section 7.4.2 of this code. Operating instructions for performing the transfer on a legible sign in the immediate vicinity of the point of transfer.

**R 29.6075 Filling and evacuating containers.**

**Rule 75.** Sections 7.2.2.1, and 7.2.2.10(2) of the code are amended, and subsections 7.2.2.5.1(a) and 7.2.2.5.1(b) of the code are added, as follows:

The transfer of LP-gas out of or into a stationary container shall only be accomplished with authorization from the stationary container owner, and the transfer shall only be conducted by qualified persons trained in proper handling and operating procedures in accordance with the provisions of Section 4.4 of these rules. The person conducting the transfer of LP-gas shall also notify the owner of the container 2 working days before the transfer.

**7.2.2.5.1(a)** Owners and operators shall post the following legible wording, with letters not less than 3 inches (7.5 centimeters) in height and in plain view at a container filling location.

**No Smoking – No Open Flames**

Owner and operators shall post the following legible wording, with letters not less than 1/4 inch (1/2 centimeters) in height:

**Warning:** Filling the following types of cylinders is prohibited and violators are subject to civil and criminal penalties:

**Cylinders not approved for LP-gas.**

**Cylinders more than 12 years old that have not been properly recertified.**

**Cylinders which are damaged, burned, or which, after visual inspection, appear unsafe.**

**Cylinders that are not equipped with a collar or cap to protect the valves while in transit.**

**7.2.2.10(2)** The maximum allowable working pressure for ASME containers shall be at least in accordance with table 5.2.4.2.

**R 29.6076 Arrangement and operation of transfer systems.**

**Rule 76.** Subsections 7.2.3.2(F) and 7.2.3.2(G) of the code are added as follows:

**7.2.3.2(F)** Signage shall be posted stating “No Smoking Within 25 Feet” on both sides of the container.

**7.2.3.2(G)** Signage shall be posted stating “Flammable Gas” on both sides of the container.

**R 29.6077 Purging.**

**Rule 77.** Section 7.3.2.1 of the code is amended, and sections 7.3.2.5 and 7.3.2.5.1 of the code are added, as follows:

**7.3.2.1** Venting of gas from containers for purging or for other purposes shall be accomplished in accordance with sections 7.3.2.2 to 7.3.2.5.1.

Venting of containers and burning of LP-gas in containers shall be allowed only when the activity is attended and carefully monitored so adjustments can be made if conditions change.

**7.3.2.5.1** If container is to remain open after purging, all odorant shall be removed.

**R 29.6078 General provisions for the volumetric method of filling containers.**

**Rule 78.** Subsection 7.4.3.2(A) of the code is amended as follows:

**7.4.3.2(A)** If a fixed maximum liquid level gauge or a variable liquid level gauge without liquid volume temperature correction is used, the liquid level indicated by these gauges shall be computed based on the maximum permitted filling limit when the liquid is at 40 degrees Fahrenheit (4 degrees Celsius) for aboveground containers, 50 degrees Fahrenheit (10 degrees Celsius) for underground containers, or -10 degrees Fahrenheit (-23 degrees Celsius) for composite cylinders.

**R 29.6079 Location of storage outside of buildings.**

**Rule 79.** Section 8.4.1.1 of the code is amended as follows:

Storage outside of buildings for cylinders awaiting use, resale, or part of a cylinder exchange point shall be located as follows:

- (a) At least 10 feet (3 meters) from any doorway or opening in a building frequented by the public where occupants have at least 2 means of egress.
- (b) At least 10 feet (3 meters) from any doorway or opening in a building or sections of a building that has only 1 means of egress.
- (c) At least 20 feet (6.1 meters) from any automobile service station fuel dispenser.

**R 29.6080 Transportation of portable containers of more than 1,000 pounds (454 kilograms) water capacity.**

**Rule 80.** Section 9.3.3.2 of the code is amended as follows:

Portable containers shall be constructed in accordance with section 5.7 and equipped in accordance with section 5.2 for portable use and shall comply with DOT portable tank specifications for LP-gas service.

**R 29.6081 Painting and marking cargo tank vehicles.**

**Rule 81.** Section 9.4.6.1 of the code is amended as follows:

**9.4.6.1** Painting of cargo tank vehicles shall comply with Title 49, Code of Federal Regulations, “*Transportation*”, as adopted by reference in section 2.3.9.

**R 29.6082 Buildings or structures housing LP-gas distribution facilities.**

**Rule 82.** Sections 10.4 and 10.4.1 of the code are added as follows:

**10.4** Electrical equipment.

**10.4.1 All electrical equipment and wiring installed in a building or room in the scope of this chapter shall comply with sections 6.20.2.1 and 6.20.2.2.**

**R 29.6083 Engine fuel systems. Scope.**

**Rule 83. Section 11.1.2.1 of the code is amended as follows:**

**General purpose vehicle engines fueled by LP-gas. Vehicles complying with the federal motor vehicle safety standards covering the installation of LP-gas fuel systems on vehicles and certified by the vehicle manufacturer as meeting the standards need not comply with chapter 11 of this code except for section 11.11.**

**R 29.6084 Container design.**

**Rule 84. Sections 11.3.1.1, 11.3.1.3, 11.3.1.4, 11.3.1.5, and 11.3.1.6 of the code are amended, section 11.3.1.2 of the code is deleted, and sections 11.3.1.7, and 11.3.1.8 of the code are added, as follows: Containers shall be designed, fabricated, tested, and marked (or stamped) in accordance with the regulations of the DOT, the ASME “*Boiler and Pressure Vessel Code*,” Section VII, “Rules for the Construction of Unfired Pressure Vessels” or the API-ASME “*Code for Unfired Pressure Vessels for Petroleum Liquids and Gases*,” except for UG-125 through UG-136.**

**Deleted.**

**Containers fabricated to earlier editions of regulations, rules, or codes listed in section 5.2.1.1 and of the interstate commerce commission (ICC) “*Rules for Construction of Unfired Pressure Vessels*,” prior to April 1, 1967, shall be permitted to be used in accordance with section 1.4.**

**Containers that have been involved in a fire and show no distortion shall be requalified for continued service before being used or reinstalled.**

**Cylinders shall be requalified by a manufacturer of that type of cylinder or by a repair facility approved by DOT.**

**ASME or API-ASME containers shall be retested using the hydrostatic test procedure applicable at the time of the original fabrication.**

**All container appurtenances shall be replaced.**

**DOT 4E specification aluminum cylinders and composite cylinders involved in a fire, and the cylinders show evidence of fire damage, then the cylinders shall be permanently removed from service.**

**A cylinder with an expired requalification date shall not be refilled until it is requalified by the methods prescribed in DOT regulations.**

**Cylinders shall be designed and constructed for at least 240 psig (1.6 MPag) service pressure.**

**Cylinders shall be continued in service and transported in accordance with DOT regulations.**

**Engine fuel containers shall be either the permanently installed or exchangeable type.**

**R 29.6085 Container design pressure.**

**Rule 85. Section 11.3.2 of the code is amended adding sections 11.3.2.1 and 11.3.2.2 as follows:**

**11.3.2 Container maximum allowable working pressure.**

**ASME engine fuel and mobile containers shall have the following maximum allowable working pressure:**

**250 psig (1.7 MPag) or 312 psig (2.2 MPag) where required if constructed prior to April 1, 2001.**

**312 psig (2.2MPag) if constructed on or after April 1, 2001.**

ASME containers installed as in enclosed spaces on vehicles and all engine fuel containers for vehicles, industrial trucks, buses (including school buses), recreational vehicles, and multipurpose passenger vehicles shall be constructed with a design pressure of at least 312 psig (2.2 MPag).

**R 29.6086 Container corrosion protection.**

**Rule 86.** Section 11.3.7 of the code is amended as follows:

**11.3.7 Container corrosion protection.** Engine fuel containers constructed of steel shall be painted to minimize corrosion.

**R 29.6087 General requirements for appurtenances.**

**Rule 87.** Subsection 11.4.1.7(B) and sections 11.4.1.2, 11.4.1.9, and 11.4.1.13 of the code are amended, as follows:

**11.4.1.2 Container appurtenances** subject to pressures in excess of 125 psig (0.9 MPag) shall be rated for a pressure of at least 250 psig (1.7 MPag).

**11.4.1.7(B)** The start-to-leak setting of such pressure relief valve, with relation to the maximum allowable working pressure of the container, shall be in accordance with table 5.7.2.4(A).

**Pressure relief valves** shall be marked with the following:

The pressure in psig (kPa) at which the valve is set to start to leak.

The rated relieving capacity in cubic feet per minute of air at 60 degrees Fahrenheit (15.6 degrees Celsius) and 14.7 psia (101 kPa).

The manufacturer's name and catalog number.

**11.4.1.13** ASME containers fabricated after January 1, 1984, for use as engine fuel containers on vehicles shall be equipped or fitted with an overfilling prevention device.

**R 29.6088 Carburetion equipment.**

**Rule 88.** Section 11.5.1 of the code is amended as follows:

**Pressure.** Carburetion equipment subject to pressure in excess of 125 psig (0.9 MPag) shall be designed for a pressure of 250 psig (1.7 MPag) or for the maximum allowable working pressure of the container when the design pressure of the container is greater than 250 psig (1.7MPag).

**R 29.6089 Vaporizers.**

**Rule 89.** Sections 11.5.2.3 and 11.5.2.4 of the code are amended as follows:

**11.5.2.3 Vaporizers** subjected to container pressure shall have a pressure rating of 250 psig (1.7 MPag) or the maximum allowable working pressure of the container when the design pressure of the container is greater than 250 psig (1.7 MPag).

**11.5.2.4 Vaporizers** shall be marked with the maximum allowable working pressure of the fuel containing portion in psig (MPag). The marking shall be visible when the vaporizer is installed.

**R 29.6090 Fittings.**

**Rule 90.** Sections 11.6.2.1, 11.6.2.2, 11.6.2.3, 11.6.2.4, and 11.6.2.5 of the code are amended, section 11.6.2.6 of the code is deleted, and table 11.6.2.2 of the code is added as follows:

**11.6.2.1 Fittings** shall be steel, brass, copper, malleable iron, or ductile (nodular) iron.

**11.6.2.2 Pipe fittings** shall have a minimum pressure rating as specified in table 11.6.2.2 and shall comply with the following:

(a) Cast-iron pipe fittings shall not be used.

(b) Brazing filler material shall have a melting point that exceeds 1,000 degrees Fahrenheit (538 degrees Celsius).

**Table 11.6.2.2**

**Service Pressure Rating of Pipe, Tubing, Fittings, and Valves**

<b>Service</b>	<b>Minimum Pressure</b>
Higher than container pressure	350 psig (2.4 MPag), or the MAWP, whichever is higher, or 400 psig (2.8 MPag) water/oil/gas rating
LP-gas liquid, or vapor at operating Pressure over 125 psig (0.9 MPag) and at or below container pressure	250 psig (1.7 MPag)
LP-gas vapor at operating pressure of 125 psig (0.9 MPag) or less	125 psig (0.9 MPag)

Metal tube fittings shall have a minimum pressure rating as specified in Table 11.6.2.2.

Fittings used with liquid LP-gas or with the vapor LP-gas at operating pressures over 125 psig (0.9 MPag) shall be designed for a pressure rating of at least 250 psig (1.7 MPag) or the maximum allowable pressure rating of the container, whichever is greater.

11.6.2.5 Fittings for use with vapor LP-gas at pressures in excess of 5 psig (34.5 kPag) and not in excess of 125 psig (0.9 MPag) shall be designed for a maximum allowable working pressure of 125 psig (0.9 MPag).

11.6.2.6 Deleted.

**R 29.6091 Hose, hose connections, and flexible connectors.**

**Rule 91.** Sections 11.6.3.1, 11.6.3.5, and 11.6.3.7 of the code are amended as follows:

11.6.3.1 Hose, hose connections, and flexible hose connectors used for conveying LP-gas liquid or vapor at pressures in excess of 5 psig (34.5 kPag) shall be fabricated of materials compatible with LP-gas both as liquid and vapor and the hose and flexible hose connector shall be of reinforced construction.

Hose assemblies after the application of the connections shall be capable of withstanding a pressure of not less than 700 psig (4.8 MPag). If a test is performed, such assemblies shall be leak tested at pressures between the operating and 120% of the pressure rating.

Hose in excess of 5 psig (34.5 kPag) service pressure and quick connectors shall be listed or approved.

**R 29.6092 Container design temperature and pressure.**

**Rule 92.** Sections 12.1.2.1 and 12.1.2.2 of the code are deleted, and section 12.1.2.3 of the code is amended, as follows:

Deleted.

Deleted.

The design of the ASME containers shall include a minimum 5% increase in the absolute vapor pressure of the LP-gas at the design storage temperature. The margin (both positive and vacuum) for low-pressure API standard 620, *“Design and Construction of Large, Welded, Low-Pressure Storage Tanks,”* vessels shall include the following:

The control range of the boil-off handling system.  
The effects of flash or vapor collapse during filling operations.  
The flash that can result from withdrawal pump recirculation.  
The normal range of barometric pressure changes.

**R 29.6093 Marking on refrigerated LP-gas containers.**

**Rule 93.** Section 12.2.1 of the code is amended as follows:

Each refrigerated LP-gas container shall be identified by the attachment of a name plate located either on the container or in a visible location.

**R 29.6094 Piping.**

**Rule 94.** Section 12.3.3.4 of the code is amended as follows:

12.3.3.4 Gaskets used to retain LP-gas in containers shall be fabricated with materials compatible with LP-gas.

**R 29.6095 Refrigerated LP-gas container impoundment.**

**Rule 95.** Section 12.5.7 of the code is deleted as follows:

Deleted.

**R 29.6096 Operations and maintenance.**

**Rule 96.** Sections 14.1.1 and 14.1.2 of the code are added as follows:

Multiple containers in vapor service only, with individual water capacity not exceeding 1,200 gallons (4.54 cubic meters) water capacity with an aggregate of 6,000 gallons (22.7 cubic meters) shall not require written operation or maintenance procedures where they are not manifolded together.

Industrial and some other installations with a capacity of 10,000 pounds (2,250 gwc) or more may be required by United States Environmental Protection Agency regulations to have an operation and maintenance manual.

**R 29.6097 Small LP-gas systems (SLGS).**

**Rule 97.** Sections 14.4.1, 14.4.2, 14.4.3, 14.4.4, 14.4.5, 14.4.6, 14.4.7, 14.4.8, 14.4.9, 14.4.10, 14.4.11, 14.4.12, and 14.4.13 of the code are added as follows:

**14.4.1 Application.**

A SLGS shall be a system with 99 or fewer users connected to a single supply source, except for the following:

A system with 9 or fewer users where no part of the system is located in a public place.

A system supplying 1 user where the system is located entirely on the users premises.

Each meter or regulator outlet connected to a consumer of gas shall be considered a user.

**Registration.**

Each SLGS shall register as follows:

The DOT pipeline and hazardous materials safety administration (PHMSA).

An installation that meets the requirements of section 1.9.

Each SLGS shall identify the entity which controls, operates, repairs, modifies, or installs the system.

**14.4.3 Damage prevention.** Each SLGS shall maintain a damage prevention program to minimize damage to underground portions of the system.

Each SLGS shall register and participate in a one call notification center located in the geographical area of the system location.

**14.4.4 Incident reporting.**

Incidents shall be reported, to the PHMSA, that involve 1 or more of the following:

The release of gas from the SLGS where death(s) occurs or personal injury resulting in-patient hospitalization occurs.

The estimated property damage, including the cost of gas or both exceeds \$50,000.00

Incident reports shall contain an analysis of the cause of the accident, repairs made and other significant factors.

**14.4.5 SGLS piping system service limitations. Pressure limits shall be in accordance with section 6.8.**

**Odorization.** Each delivery to a SLGS shall be tested for the presence of odorization in accordance with section 4.2.3. The results of the tests shall be documented.

**Construction records, maps and operating history.** Each SLGS shall provide construction records, maps, equipment and operating history of the system and make them available to operating personnel and to the PHMSA.

**Key valve maintenance.** Key valves that are used to shut down the system or parts of the system, in case of emergency shall be maintained annually, and the maintenance shall be documented.

Key valves include the container valves and any additional valves that can be shut off.

**Leak testing.**

Each SLGS shall be tested prior to startup in accordance with section 6.12.

Each lateral service line that has been disconnected from the main shall be pressure tested in accordance with section 6.12 before placing it back in service.

**Response to gas leak reports and interruption of gas service.** Each system shall have a written procedure for response to reports of gas leakage. All employees who respond to gas leakage calls shall be trained in the procedure.

**Operator qualification and covered tasks.**

Each SLGS shall have a written procedure for training operators in covered tasks, which meet the requirements of section 4.4.

**Leak surveys.**

SLGS leak surveys shall be performed either as necessary or at a minimum of every 5 years.

SLGS leak surveys performed using gas detection equipment shall include a subsurface survey where underground piping is a part of the system.

SLGS leak surveys shall utilize flame ionization detectors, combustible gas indicators and other means of leak detection.

Where leakage is found, equipment that gives a numerical reading shall be used to determine the seriousness and location of the leak, and shall be repaired immediately.

**Consumer education.** Each SLGS operator shall provide information to users and other residents in the area of a SLGS annually.

Consumer education materials must include the characteristics and propensities of LP-gas.

Consumer education materials shall be furnished to each active connected service location.

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**NOTICE OF PUBLIC HEARING**

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2006-064

**NOTICE OF PUBLIC HEARING  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
WASTE AND HAZARDOUS MATERIALS DIVISION**

The Michigan Department of Environmental Quality (DEQ), Waste and Hazardous Materials Division (WHMD), will conduct public hearings on two different proposed administrative rules packages promulgated pursuant to the Fire Prevention Code, 1941 PA 207 (Act 207); R 29.4001 to R 29.4003, R 29.4021 to R 29.4035, R 29.6001, R 29.6002, and R 29.6036 to R 29.6097; and R 29.7001, R 29.7002, R 29.7010 to R 29.7068, and R 29.7071 to R 29.7127, respectively. The first proposed rules package addresses the storage, handling, and dispensing of liquefied petroleum gas (LPG) and provides for the use of new technology. The second proposed rules package addresses the storage, handling, and dispensing of liquefied and gaseous hydrogen.

The public hearing on the LPG rules will be held on September 18, at 10:00 a.m. The public hearing on the hydrogen rules will be held on September 18, 2007, at 1:00 p.m. Both public hearings will be held in the Con-Con Conference Room, Constitution Hall, Atrium Level South, 525 West Allegan Street, Lansing, Michigan 48933.

Copies of the proposed rules (SOAHR 2006-064EQ and SOAHR 2006-063EQ, respectively) can be downloaded from the Internet through the State Office of Administrative Hearings and Rules at <http://www.michigan.gov/orr>. Copies of the rules may also be obtained by contacting the Lansing office at:

Waste and Hazardous Materials Division  
Michigan Department of Environmental Quality  
P.O. Box 30241  
Lansing, Michigan 48909-7741  
Phone: 517-335-7211  
Fax: 517-335-2245

All interested persons are invited to attend and present their views. It is requested that all statements be submitted in writing for the hearing record. Anyone unable to attend may submit comments in writing to the address above. Written comments must be received by September 25, 2007.

Persons needing accommodations for effective participation in the meeting should contact the WHMD at 517-335-7211 one week in advance to request mobility, visual, hearing, or other assistance.

This notice of public hearing is given in accordance with Sections 41 and 42 of Michigan's Administrative Procedures Act, 1969 PA 306, as amended, being Sections 24.241 and 24.242 of the Michigan Compiled Laws (MCL). Administration of the rules is by authority conferred on the Director of the DEQ by Section 3c of Act 207, being Section 29.3c of the MCL and Executive Order 1998-2. These rules will become effective seven days after filing with the Secretary of State.

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**CORRECTION OF OBVIOUS  
ERRORS IN PUBLICATION**

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*MCL 24.256(1) states in part:*

*“Sec. 56. (1) The State Office of Administrative Hearings and Rules shall perform the editorial work for the Michigan register and the Michigan Administrative Code and its annual supplement. The classification, arrangement, numbering, and indexing of rules shall be under the ownership and control of the State Office of Administrative Hearings and Rules, shall be uniform, and shall conform as nearly as practicable to the classification, arrangement, numbering, and indexing of the compiled laws. The State Office of Administrative Hearings and Rules may correct in the publications obvious errors in rules when requested by the promulgating agency to do so...”*

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**CORRECTION OF OBVIOUS  
ERRORS IN PUBLICATION**

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August 21, 2007

Ms. Norene Lind, Rules Manager  
Department of Labor & Economic Growth  
State Office of Administrative Hearings and Rules (SOAHR)  
Ottawa Building, Fourth Floor  
Lansing, Michigan 48909

Re: 2006-044 Board of Psychology Rules – Correction

Dear Ms. Lind:

It has been brought to my attention that a correction to the Board of Psychology (SOAHR #2006-044) administrative rules is needed pursuant to Section 56(1) of the Administrative Procedures Act.

Specifically, the version of these rules that are posted on the SOAHR website does not include the proper case tense, as requested by the Legislative Service Bureau. The rule language posted on your website is as follows:

R 338.2511(3)(b) The accreditation guidelines and principles of the american psychological association as set forth in the publication entitled “Guidelines and Principles for Accreditation of Programs in Professional Psychology”, July 1, 2005, which is available for inspection and distribution at cost from the Board of Psychology, Bureau of Health Professions, Michigan Department of Community Health, 611 West Ottawa, Lansing, MI 48909. Copies of the guidelines are available at no cost from the American Psychological Association, 750 First Street NE, Washington, DC 20002-4242 or at the association’s website at <http://www.apa.org>.

Please change the word “american” to “American”.

Thank you for your assistance.

Sincerely,

Mary A. Greco  
Legal Affairs Specialist, Office of Legal Affairs

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**ENROLLED SENATE AND HOUSE BILLS  
SIGNED INTO LAW OR VETOED  
(2007 SESSION)**

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*Mich. Const. Art. IV, §33 provides: “Every bill passed by the legislature shall be presented to the governor before it becomes law, and the governor shall have 14 days measured in hours and minutes from the time of presentation in which to consider it. If he approves, he shall within that time sign and file it with the secretary of state and it shall become law . . . If he does not approve, and the legislature has within that time finally adjourned the session at which the bill was passed, it shall not become law. If he disapproves . . . he shall return it within such 14-day period with his objections, to the house in which it originated.”*

*Mich. Const. Art. IV, §27, further provides: “No act shall take effect until the expiration of 90 days from the end of the session at which it was passed, but the legislature may give immediate effect to acts by a two-thirds vote of the members elected to and serving in each house.”*

*MCL 24.208 states in part:*

*“Sec. 8. (1) The State Office of Administrative Hearings and Rules shall publish the Michigan register at least once each month. The Michigan register shall contain all of the following:*

\* \* \*

*(b) On a cumulative basis, the numbers and subject matter of the enrolled senate and house bills signed into law by the governor during the calendar year and the corresponding public act numbers.*

*(c) On a cumulative basis, the numbers and subject matter of the enrolled senate and house bills vetoed by the governor during the calendar year.”*

**ENROLLED SENATE AND HOUSE BILLS  
SIGNED INTO LAW OR VETOED  
(2007 SESSION)**

Public Act No.	Enrolled House Bill	Enrolled Senate Bill	I.E.* Yes / No	Governor Approved Date	Filed Date	Effective Date	Subject
1		191	Yes	3/1	3/1	3/1/07	Occupations; accounting; qualifications for certified public accountants; revise, and provide certain changes to the peer review requirement. <b>(Sen. R. Richardville)</b>
2		184	Yes	3/19	3/19	3/19/07	State financing and management; budget; expenditure exceeding appropriation level; require notification. <b>(Sen. R. Jelinek)</b>
3		166	Yes	3/19	3/19	3/19/07	Appropriations; zero budget; supplemental appropriations; provide for certain fiscal years. <b>(Sen. R. Jelinek)</b>
4		014	Yes	3/22	3/22	3/22/07	Agriculture; other; loan repayment for sugar beet cooperatives; extend. <b>(Sen. J. Barcia)</b>
5		176	Yes	3/22	3/23	3/23/07	Health facilities; other; appropriated amount of quality assurance assessment collected; increase. <b>(Sen. D. Cherry)</b>
6		221	Yes	4/30	4/30	4/30/07	Appropriations; supplemental; negative supplemental school aid bill; provide for fiscal year 2006-2007. <b>(Sen. R. Jelinek)</b>
7		404	Yes	5/4	5/4	5/4/07	Appropriations; supplemental; multidepartment supplemental for fiscal year 2006-2007; provide for. <b>(Sen. R. Jelinek)</b>
8	4143		Yes	5/10	5/11	5/11/07	Watercraft; violations; certain marine safety misdemeanor violations; designate as state civil infraction. <b>(Rep. S. Bieda)</b>

\* - I.E. means Legislature voted to give the Act immediate effect.

\*\* - Act takes effect on the 91<sup>st</sup> day after *sine die* adjournment of the Legislature.

\*\*\* - See Act for applicable effective date.

+ - Line item veto

# - Tie bar

Public Act No.	Enrolled House Bill	Enrolled Senate Bill	I.E.* Yes / No	Governor Approved Date	Filed Date	Effective Date	Subject
9	4482		Yes	5/18	5/18	5/18/07	Human services; other; certain family independence program eligibility and sanction for certain noncompliance; clarify. <b>(Rep. B. Clack)</b>
10	4327		Yes	5/24	5/24	5/24/07	Crimes; other; prohibition against selling tomatoes that are not vine-ripened; repeal. <b>(Rep. D. Spade)</b>
11	4322		Yes	5/24	5/24	5/24/07	Liquor; licenses; issuance of on-premises liquor license for certain universities; expand to include certain entities located in Oakland community college and Macomb community college. <b>(Rep. B. Farrah)</b>
12		400	Yes	5/29	5/29	5/29/07 #	Economic development; plant rehabilitation; definition of industrial property; modify. <b>(Sen. J. Allen)</b>
13	4629		Yes	5/29	5/29	5/29/07 #	Economic development; plant rehabilitation; strategic response center; provide for definition. <b>(Rep. G. McDowell)</b>
14	4721		Yes	5/29	5/29	5/29/2007	Environmental protection; water pollution; baseline environmental assessment fee; extend sunset. <b>(Rep. D. Bennett)</b>
15	4530		Yes	6/6	6/6	6/6/07	Retirement; public school employees; actuarial liability contribution; modify. <b>(Rep. L. Gonzales)</b>
16	4512		Yes	6/6	6/6	6/6/07	Retirement; state employees; actuarial liability contribution; modify. <b>(Rep. L. Gonzales)</b>
17		436	Yes	6/6	6/6	6/6/07 +	Appropriations; supplemental; multidepartment supplemental for fiscal year 2007; provide for. <b>(Sen. R. Jelinek)</b>

\* - I.E. means Legislature voted to give the Act immediate effect.

\*\* - Act takes effect on the 91<sup>st</sup> day after *sine die* adjournment of the Legislature.

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+ - Line item veto

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Public Act No.	Enrolled House Bill	Enrolled Senate Bill	I.E.* Yes / No	Governor Approved Date	Filed Date	Effective Date	Subject
18	4850		Yes	6/12	6/12	6/12/07	State financing and management; funds; securitization of tobacco funds; increase amount. <b>(Rep. V. Smith)</b>
19	4207		Yes	6/14	6/14	6/14/07	Occupations; nurses; licensure of graduates from a nursing education program located outside the United States who do not have a certificate from the commission on graduates of foreign nursing schools; provide for. <b>(Rep. H. Hopgood)</b>
20		344	Yes	6/19	6/19	6/19/07	Criminal procedure; sentencing guidelines; citation reference for crime of receiving or concealing stolen property having a value of \$20,000 or more or with prior convictions; revise, and divide section into multiple sections and provide chapter and part headings, and allow use of interactive video technology in courts. <b>(Sen. W. Kuipers)</b>
21		194	Yes	6/19	6/19	6/19/07	Education; alternative; provisions regarding financial responsibility for certain children enrolled in strict discipline academies; revise. <b>(Sen. M. Switalski)</b>
22	4766		Yes	6/26	6/26	6/26/07	Retirement; investments; employer contribution; revise. <b>(Rep. L. Gonzales)</b>
23		025	Yes	6/28	6/28	6/28/07 #	Disabilities; qualified interpreter for deaf or deaf-blind individual; provide in certain circumstances. <b>(Sen. J. Gleason)</b>
24	4208		Yes	6/28	6/28	6/28/07 #	Disabilities; qualified interpreter for deaf or deaf-blind individual; define and provide in certain circumstances. <b>(Rep. D. Spade)</b>

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\*\*\* - See Act for applicable effective date.

+ - Line item veto

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Public Act No.	Enrolled House Bill	Enrolled Senate Bill	I.E.* Yes / No	Governor Approved Date	Filed Date	Effective Date	Subject
25	4261		Yes	6/28	6/28	6/28/07	Economic development; other; convention and tourism promotion act; provide for. <b>(Rep. M. Sak)</b>
26		360	Yes	6/28	6/28	6/28/07 #	Transportation; funds; deadline for projects eligible for funding through local match grant programs; extend. <b>(Sen. J. Gilbert)</b>
27	4556		Yes	6/28	6/28	6/28/07 #	Transportation; funds; date revisions; provide for. <b>(Rep. J. Mayes)</b>
28		487	Yes	6/28	6/28	6/28/07	Liens; construction; requirement that owner provide notice of receipt and a copy of sworn statement to subcontractors, laborers, and suppliers; limit to residential projects. <b>(Sen. V. Garcia)</b>
29	4661		Yes	6/28	6/28	6/28/07	Education; other; term as president and vice president of Detroit school board; clarify. <b>(Rep. L. Lemmons)</b>
30		561	Yes	6/28	6/29	6/29/07	Revenue sharing; counties; distributions to authorities; extend for current fiscal year. <b>(Sen. J. Pappageorge)</b>
31	4376		Yes	6/29	6/29	6/29/07	Property tax; payment and collection; collection of municipal solid waste fee; allow. <b>(Rep. G. Cushingberry)</b>
32		070	Yes	7/1	7/2	7/2/07	Education; teachers; date for implementation of requirement for current teachers to receive certain training concerning reading problems; extend to July 1, 2009. <b>(Sen. N. Cassis)</b>
33		266	Yes	7/10	7/10	7/10/07	Occupations; business licensing and regulation; household goods; provide exemption from certification by public service commission of certain carriers. <b>(Sen. V. Garcia)</b>

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Public Act No.	Enrolled House Bill	Enrolled Senate Bill	I.E.* Yes / No	Governor Approved Date	Filed Date	Effective Date	Subject
34	4851		Yes	7/10	7/11	7/11/07	Higher education; financial aid; transfers of money by Michigan higher education student loan authority to Michigan merit award trust fund; authorize. <b>(Rep. A. Meisner)</b>
35	4177		Yes	7/10	7/11	7/11/07	Insurance; no-fault; premium increases or reinstatement fees for certain military personnel called into active duty; prohibit. <b>(Rep. D. Spade)</b>
36		094	Yes	7/12	7/12	1/1/08 #	Single business tax; replacement; Michigan business tax act; create. <b>(Sen. N. Cassis)</b>
37	4369		Yes	7/12	7/12	7/12/07 #	Education; financing; exemption for certain personal property from certain school operating mills; provide for. <b>(Rep. T. Brown)</b>
38	4370		Yes	7/12	7/12	7/12/07 #	Property tax; state education tax; tax exemption for certain industrial personal property; exempt. <b>(Rep. M. Griffin)</b>
39	4371		Yes	7/12	7/12	7/12/07 #	Economic development; plant rehabilitation; calculation of tax levied; revise. <b>(Rep. M. Corriveau)</b>
40	4372		Yes	7/12	7/12	7/12/07 #	Property tax; exemptions; commercial and industrial personal property; exempt from certain taxes. <b>(Rep. K. Ebli)</b>
41	4493		Yes	7/12	7/12	7/12/07	Appropriations; supplemental; multidepartment supplemental for fiscal year 2006-2007; provide for. <b>(Rep. G. Cushingberry)</b>

\* - I.E. means Legislature voted to give the Act immediate effect.

\*\* - Act takes effect on the 91<sup>st</sup> day after *sine die* adjournment of the Legislature.

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Public Act No.	Enrolled House Bill	Enrolled Senate Bill	I.E.* Yes / No	Governor Approved Date	Filed Date	Effective Date	Subject
42	4595		Yes	7/12	7/13	7/13/07	Higher education; financial aid; eligibility for Michigan promise award; expand to include certain residents who graduated from out-of-state high schools and revise application deadline and disbursement schedule. <b>(Rep. K. Angerer)</b>
43		134	Yes	7/17	7/17	7/17/07	Property; conveyances; transfer of certain state owned properties in Ingham county, Wayne county, and Tuscola county; provide for, and release certain property rights reserved by the state. <b>(Sen. M. Switalski)</b>
44		588	Yes	7/17	7/17	7/17/07	Economic development; commercial redevelopment; corridor improvement authority; revise eligibility criteria. <b>(Sen. S. Thomas)</b>
45		188	Yes	7/17	7/17	7/17/07	Education; vocational; definition of vocational education and use of vocational education funds; revise, and allow certain acquisition of equipment. <b>(Sen. G. Van Woerkom)</b>
46		290	Yes	7/17	7/17	7/17/07	Financial institutions; mortgage brokers and lenders; licensing requirements for secondary mortgage companies; exempt certain employees and leased employees. <b>(Sen. R. Richardville)</b>
47		354	Yes	8/2	8/3	8/3/07 #	Natural resources; wildlife; double-crested cormorant; provide for control program. <b>(Sen. M. McManus)</b>
48	4471		Yes	8/2	8/3	8/3/07 #	Natural resources; wildlife; double-crested cormorant; define terms for control program. <b>(Rep. D. Booher)</b>

\* - I.E. means Legislature voted to give the Act immediate effect.

\*\* - Act takes effect on the 91<sup>st</sup> day after *sine die* adjournment of the Legislature.

\*\*\* - See Act for applicable effective date.

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Public Act No.	Enrolled House Bill	Enrolled Senate Bill	I.E.* Yes / No	Governor Approved Date	Filed Date	Effective Date	Subject
49	4614		Yes	8/2	8/3	8/3/07 #	Natural resources; wildlife; double-crested cormorant; provide for control fund. <b>(Rep. J. Sheltrown)</b>
50	4884		Yes	8/13	8/14	8/14/07	State financing and management; funds; Michigan trust fund; provide general amendments for tobacco securitization. <b>(Rep. S. Jackson)</b>

\* - I.E. means Legislature voted to give the Act immediate effect.

\*\* - Act takes effect on the 91<sup>st</sup> day after *sine die* adjournment of the Legislature.

\*\*\* - See Act for applicable effective date.

+ - Line item veto

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**MICHIGAN ADMINISTRATIVE CODE TABLE**  
**(2007 SESSION)**

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*MCL 24.208 states in part:*

*“Sec. 8. (1) The State Office of Administrative Hearings and Rules shall publish the Michigan register at least once each month. The Michigan register shall contain all of the following:*

\*       \*       \*

*(i) Other official information considered necessary or appropriate by the State Office of Administrative Hearings and Rules.”*

*The following table cites administrative rules promulgated during the year 2000, and indicates the effect of these rules on the Michigan Administrative Code (1979 ed.).*

**MICHIGAN ADMINISTRATIVE CODE TABLE  
(2007 RULE FILINGS)**

R Number	Action	2007 MR Issue	R Number	Action	2007 MR Issue	R Number	Action	2007 MR Issue
28.4001	A	13	281.429	A	3	338.3102	*	4
28.4002	A	13	325.2651	*	3	338.3120	*	4
28.4003	A	13	325.2652	*	3	338.3123	*	4
28.4004	A	13	325.2653	*	3	338.3125	*	4
28.4005	A	13	325.2654	*	3	338.3132	*	4
28.4006	A	13	325.2655	*	3	338.3154	*	4
28.4007	A	13	325.2656	*	3	338.3161	*	4
32.71	A	10	325.2657	*	3	338.3162	*	4
32.72	A	10	325.2658	*	3	338.3162b	*	4
32.73	A	10	325.52601	A	10	338.3162c	*	4
32.74	A	10	325.52602	A	10	338.3162d	*	4
32.75	A	10	325.60025	*	3	339.22203	*	2
32.76	A	10	336.1660	A	2	339.22213	*	2
32.77	A	10	336.1661	A	2	339.22601	*	2
32.78	A	10	336.1802a	A	12	339.22602	*	2
32.79	A	10	336.1803	*	12	339.22603	*	2
32.8	A	10	336.1821	A	12	339.22604	*	2
32.81	A	10	336.1822	A	12	339.22605	*	2
32.82	A	10	336.1823	A	12	339.22606	A	2
32.83	A	10	336.1824	A	12	339.22607	*	2
32.84	A	10	336.1825	A	12	339.22609	*	2
32.85	A	10	336.1826	A	12	339.22613	*	2
32.86	A	10	336.1830	A	12	339.22615	*	2
32.87	A	10	336.1831	A	12	339.22617	*	2
32.88	A	10	336.1832	A	12	339.22631	*	2
32.89	A	10	336.1833	A	12	339.22639	R	2
205.56	*	6	336.1834	A	12	339.22641	R	2
205.72	*	6	338.471a	*	4	339.22645	*	2
205.126	*	6	338.472	*	4	339.22651	*	2
205.127	*	6	338.473	*	4	339.22652	A	2
205.136	*	6	338.473a	*	4	339.22653	R	2
281.421	A	3	338.473d	*	4	339.22654	R	2
281.422	A	3	338.474a	*	4	339.22655	R	2
281.423	A	3	338.475	*	4	339.22659	*	2
281.424	A	3	338.479a	*	4	339.22663	R	2
281.425	A	3	338.489	*	4	339.22664	R	2
281.426	A	3	338.3041	*	4	339.22665	*	2
281.427	A	3	338.3043	*	4	388.1	A	6
281.428	A	3	338.3044	*	4	388.2	A	6

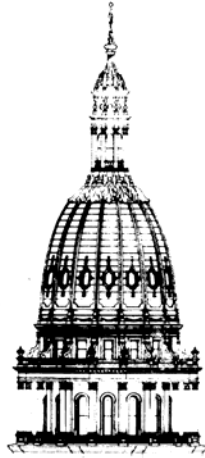
(\* Amendment to Rule, A Added Rule, N New Rule, R Rescinded Rule)

R Number	Action	2007 MR Issue	R Number	Action	2007 MR Issue	R Number	Action	2007 MR Issue
388.3	A	6	408.806	*	8	408.42602	*	5
388.4	A	6	408.833	*	8	408.42605	*	5
388.5	A	6	408.852	*	8	408.42608	*	5
388.6	A	6	408.882	*	8	408.42609	*	5
388.7	A	6	408.891	*	8	408.42616	*	5
388.8	A	6	408.4038	*	13	408.42624	R	5
388.9	A	6	408.4107	*	13	408.42625	R	5
388.1	A	6	408.4125	*	13	408.42628	*	5
388.11	A	6	408.13902	*	11	408.42629	*	5
388.12	A	6	408.17601	*	10	408.42634	*	5
388.13	A	6	408.17602	*	10	408.42636	*	5
388.14	A	6	408.17603	R	10	408.42648	*	5
388.15	A	6	408.17605	R	10	408.42651	*	5
388.16	A	6	408.17607	R	10	408.42655	*	5
388.17	A	6	408.17609	R	10	408.42801	A	5
388.18	A	6	408.17610	R	10	408.42804	A	5
388.151	A	13	408.17612	R	10	408.42806	A	5
388.152	A	13	408.17613	R	10	408.42809	A	5
388.153	A	13	408.17614	R	10	418.56	*	4
388.154	A	13	408.17615	R	10	418.10107	*	6
388.155	A	13	408.17616	R	10	418.10202	*	6
400.9101	*	2	408.17618	R	10	418.10401	*	6
400.9306	*	2	408.17620	R	10	418.10404	*	6
400.9401	*	2	408.17621	R	10	418.10416	*	6
400.9501	*	2	408.17622	R	10	418.10504	A	6
400.12101	*	2	408.17623	R	10	418.10505	A	6
400.12202	*	2	408.17624	R	10	418.10902	*	6
400.12214	A	2	408.17630	R	10	418.10922	*	6
400.12310	*	2	408.17631	R	10	418.101002	*	6
400.12312	*	2	408.17632	R	10	418.101002b	A	6
400.12605	*	2	408.17633	R	10	418.101004	*	6
408.43a	*	4	408.17636	R	10	418.101005	*	6
408.43i	*	4	408.17637	R	10	418.101016	*	6
408.43k	*	4	408.17640	R	10	418.101017	R	6
408.43m	*	4	408.17641	R	10	418.101018	R	6
408.43q	*	4	408.17650	R	10	418.101019	R	6
408.61	*	8	408.17651	R	10	418.101502	R	6
408.65	*	8	408.17696	R	10	418.101504	*	6
408.802	*	8	408.17699	R	10	421.1101	*	4

(\* Amendment to Rule, **A** Added Rule, **N** New Rule, **R** Rescinded Rule)

R Number	Action	2007 MR Issue	R Number	Action	2007 MR Issue
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421.1104	*	4	432.21516	*	5
421.1108	*	4	432.21520	*	5
421.1109	*	4	432.21609	*	5
421.1110	*	4	432.21617	*	5
421.1111	*	4	432.21621	*	5
421.1301	*	4	432.21622	*	5
421.1301	*	4	432.21623	*	5
421.1302	*	4	432.21805	*	5
421.1304	*	4	432.21811	*	5
421.1305	*	4	432.22004	*	5
421.1307	*	4	432.22005	*	5
421.1314	*	4	432.22006	*	5
421.1315	*	4	432.22007	*	5
421.1316	*	4	436.1629	*	9
431.2090	*	9	460.2701	A	3
431.2120	*	9	460.2702	A	3
431.3075	*	9	460.2703	A	3
431.3110	*	9	460.2704	A	3
431.4001	*	9	460.2705	A	3
431.4180	*	9	460.2706	A	3
432.21305	*	5	460.2707	A	3
432.21313	*	5	500.2211	A	9
432.21316	*	5	500.2212	A	9
432.21317	*	5	550.111	A	4
432.21326	*	5	550.112	A	4
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432.21331	*	5	550.302	A	4
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432.21333	*	5	500.2202	A	9
432.21335	*	5			
432.21336	*	5			
432.21406	*	5			
432.21408	*	5			
432.21410	*	5			
432.21412	*	5			
432.21413	*	5			
432.21416	*	5			
432.21417	*	5			

(\* Amendment to Rule, **A** Added Rule, **N** New Rule, **R** Rescinded Rule)



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